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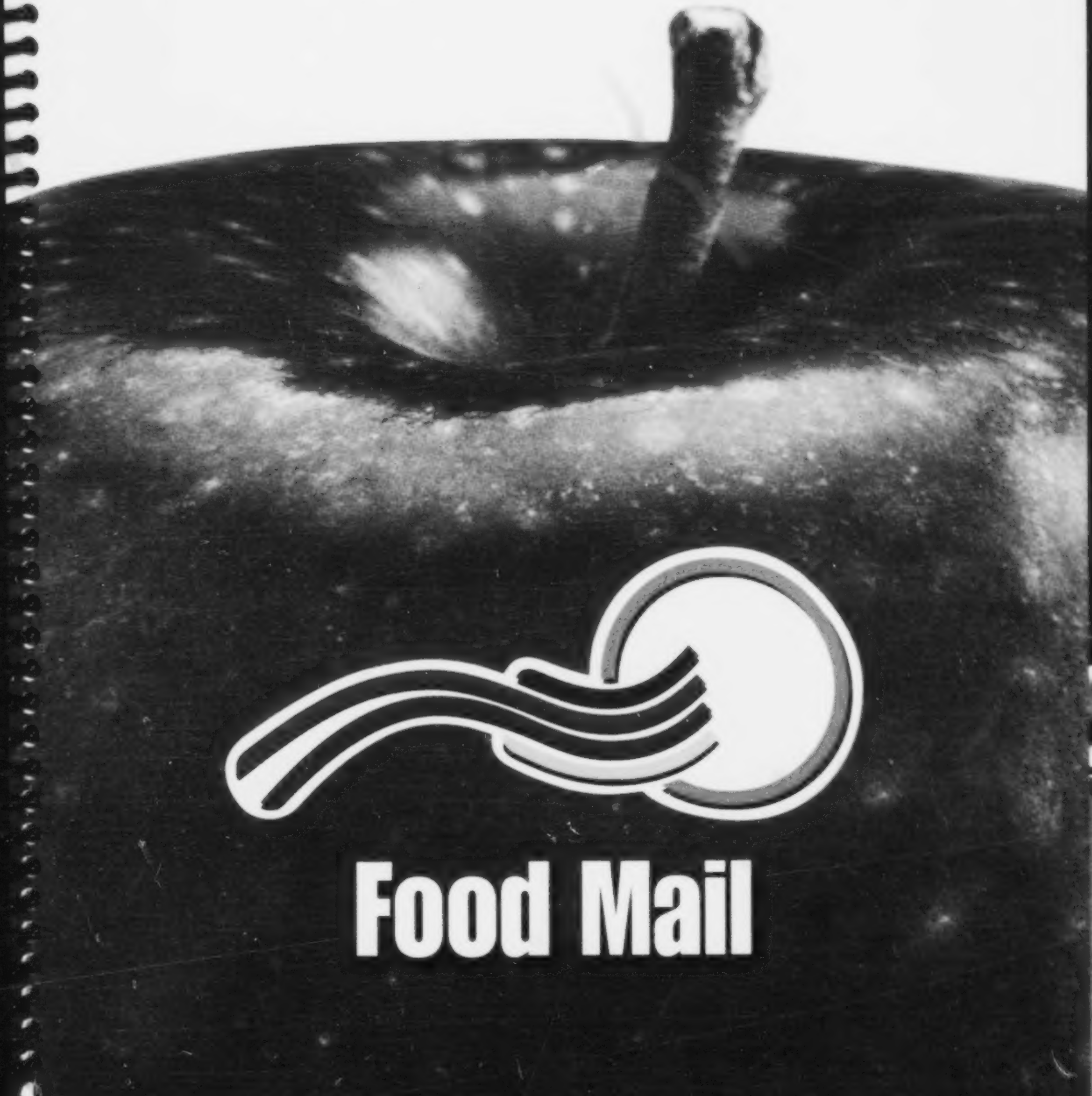
Nutrition and Food Security in Fort Severn, Ontario

Baseline Survey for the Food Mail Pilot Project



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Nutrition and Food Security in Fort Severn, Ontario

Baseline Survey for the Food Mail Pilot Project

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Dialogos Educational Consultants Inc.

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Executive Summary

Fort Severn, Ontario is a Cree community of approximately 450 people, located about 850 kilometres north of Thunder Bay. Food is trucked from Winnipeg to Pickle Lake, Ontario, the "food entry point" for the Food Mail Program. The community has a Northern store and a privately owned convenience store.

The Fort Severn Food Mail Pilot Project was initiated by Indian and Northern Affairs Canada with the support of Health Canada, the Ontario Ministry of Health and Long-Term Care, Canada Post and the Fort Severn First Nation council. Its aim was to promote healthy eating and improve food security by reducing the rate for shipping "Priority Perishables" (fresh and frozen fruit and vegetables, frozen juice concentrate, most fresh dairy products, eggs, cook-type cereal and whole wheat bread) from $0.80 per kilogram to $0.30 per kilogram, plus $0.75 per parcel, on January 1, 2003. The project also includes nutrition education and shelf labels to identify Priority Perishables.

To obtain baseline data required to measure the impact of the pilot project, trained local interviewers administered a household questionnaire to 121 First Nation households and a nutrition questionnaire to 66 First Nation women aged 15 to 44 in December 2002. The household questionnaire asked about food purchasing practices, opinions about the quality, variety and cost of certain foods, reasons for not buying more fresh fruit and vegetables and milk, demographic information and household food security, using a modified version of the United States Department of Agriculture Food Security Module. The nutrition questionnaire included a 24-hour diet recall, a food frequency questionnaire, and questions on food preparation, health and lifestyle. A second 24-hour recall was completed by 45 women. Both questionnaires had an excellent participation rate (98% of available households and available eligible women).

Nutrient intakes were analysed using nutrient values from the 2001 Canadian Nutrient File, with additional information on traditional foods from published papers by Kuhnlein et al. The C-SIDE software was used to calculate the percentage of non-pregnant, non-lactating women with a usual intake below the Estimated Average Requirement for various nutrients. Mean energy and nutrient contributions by food group and Food Mail category were also calculated.

Food costs were 82% higher than in Ottawa. Food security was a serious problem in Fort Severn, with two thirds of First Nation households classed as "food insecure" and one quarter of families experiencing hunger in the past 12 months because they were unable to afford enough food. This situation existed even though access to traditional food did not appear to be a problem or a serious concern and traditional food continues to be shared. Households on social assistance and the working poor were significantly more food insecure than those relatively well-off. Respondents cited having to pay bills, not enough income, high food costs and unemployment as the major reasons for not being able to afford enough food. Almost half of respondents in the household survey said they were "extremely concerned" about being able to afford enough food for their family.

Forty-four percent of First Nation women rated their health as fair or poor, a level six times higher than among women of this age in the Canadian population. Extreme concern about being able to afford enough food was associated with poor or fair self-rated health. Since 1992, the self-rated health of women of child-bearing age in Fort Severn has deteriorated, their concern about food costs has increased and the smoking rate has increased from 48% to 56%. For families on social assistance, a healthy diet became less affordable over this period. Nevertheless, there were some positive dietary changes since 1992, such as the substitution of aspartame-sweetened soft drinks for regular ones and more whole grain bread and yogurt. Unlike 1992, Foods of Little Nutritional Value were not an important source of energy. However, a number of serious nutrition and health issues remain. Almost half had a Body Mass Index of 30 or more, placing them at high risk of heart disease, diabetes and high blood pressure. Low activity levels and the percentage of women with a waist circumference over 88 cm also suggest that many of these women are at high risk for these diseases.

According to the Food Frequency Questionnaire and the 24-hour diet recall, traditional food consumption was much lower than in the 1992 survey of First Nation women in Fort Severn, providing only 6% of energy intake. No organ meats or traditional fat were reported. Mean energy intake for all women was only 1438 Calories, lower than in 1992 and much lower than might be expected, given the prevalence of obesity. This finding may have been influenced by a community-wide weight loss program, or it may be the result of under-reporting. Based on Estimated Average Requirements, many non-pregnant, non-lactating First Nation women had inadequate intakes of vitamin C and vitamin B_6 (two thirds of women), folate (62%), magnesium (92%), copper (43%) and iron (23%). Mean intakes of vitamin A, calcium and fibre were also very low, and the percentage of calories from saturated fat higher than recommended.

Over half of the respondents rated the quality of fruits, vegetables and milk as only fair or poor, and cited cost, poor quality, availability and lack of variety as the major barriers to purchasing more fresh fruit and vegetables and poor quality as a barrier to purchasing more milk. First Nation women in Fort Severn were eating only about one and a half servings of fruit and vegetables and about two thirds of a serving of dairy products per day. However, Priority Perishable foods were an important source of essential vitamins and minerals and fibre. It appears, therefore, that the Food Mail Pilot Project is appropriately focussed and should help to increase the consumption of more nutritious store foods, thereby improving the nutrition of women of child-bearing age as well as the food security situation of Fort Severn families.

Background

Nutrition and Food Security in Isolated Communities

A number of studies among First Nation women of child-bearing age have documented low intakes of folate, calcium, vitamin A and fibre, together with a high consumption of foods of little nutritional value [1 2 3 4 5 6 7 8 9]. The nutrition survey conducted by Indian and Northern Affairs Canada (INAC) in Fort Severn in 1992 found a higher percentage of women reporting poor or fair health compared to the general Canadian population and a higher rate of obesity among women of child-bearing age than among women in the general Canadian population [2].

The INAC nutrition survey also found that food security was a serious concern among women of child-bearing age in Fort Severn in 1992 [2]. At that time, approximately 45% of women in Fort Severn reported running out of money to buy food at least once a month in the past year, 39% reported not having enough to eat in the house in the past month, and about 40% of women were "extremely concerned" about not having enough money to buy food.

Food insecurity has been identified by the Institute of Medicine as a predisposing factor to poor health and nutrition and as a nutrition risk factor for women in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) [10]. Food insecurity among school-age children has also been associated with compromised psychosocial functioning [11]. Food insecurity or insufficiency has been linked to a decrease in the consumption of fruits and vegetables, a lower amount of food in the household and a significant increase in scores indicative of disordered eating patterns with increasing food insecurity [12]. Compared to food-secure individuals in the United States, a higher percentage of food-insecure individuals failed to follow the dietary guidelines for vitamin C and a minimum number of servings of fruits and vegetables per day [12]. Other studies have found that on a given day, women from food-insufficient households were 1.4 times more likely to have energy intakes below 50% of those recommended. Low intakes were also more likely for vitamins A, E, C and B_6 and mean calcium intakes were only 56% of the recommended allowance [13]. In Canada, Tarasuk found that low-income women who reported hunger in their household in the past 30 days also had a lower mean intake of energy, vitamin A, folate, iron and magnesium. She concluded that this low level of intake could place these women at risk of nutrient deficiencies [14].

The high cost of food in isolated Aboriginal communities and the inadequacy of social assistance payments to provide enough income to purchase a healthy diet have been reported in a number of food price surveys. In the 1992 nutrition survey, the Northern Food Basket cost over twice as much in Fort Severn as in Ottawa [15], and the cost ratio was almost as high in 2003 [16]. Other food price surveys in isolated communities in Yukon and Alberta have reported the cost of the Northern Food Basket at 80 to 200% higher than in the south [17] [18]. Even though most families in these communities also rely on traditional food, obtaining this food is not without a cost. For some families, traditional food is not accessible due to a lack of equipment, skills or time, poor health or availability [2].

Since 1991, INAC has introduced a number of changes to the Food Mail Program. These included changes to the eligibility criteria, so that all isolated communities became eligible for this subsidy, effective in October 1991. Foods of Little Nutritional Value were excluded from the program. On October 1, 1991, the rate for shipping Nutritious Perishable food to Fort Severn was increased from approximately $0.50 per kilogram to $0.75 per kilogram plus $0.75 per parcel. On October 1, 1992, the rate for perishable food was increased by $0.05 to $0.80 per kilogram, plus $0.75 per parcel. The rate for non-perishable food and non-food items was also increased to $0.75 per kilogram plus $0.75 per parcel on October 1, 1991, to $0.90 per kilogram plus $0.75 per parcel on October 1, 1992, and to $1.00 per kilogram plus $0.75 per parcel on January 1, 1994. In August 1996, certain prepared Convenience Perishable foods, such as frozen breaded fried chicken, and non-essential non-food items became ineligible for the subsidy.

Food Mail Pilot Projects

In order to reduce the cost of nutritious food and promote healthy eating, Health Canada provided funding enabling INAC to carry out a series of Food Mail Program pilot projects in isolated northern communities. This investment was part of the Food Safety and Nutrition Program initiatives announced in the 1999 federal budget.

The Ontario Ministry of Health and Long-Term Care and the community of Fort Severn agreed to participate in a pilot project. Fort Severn was selected because it is one of the few communities in Ontario that use the Food Mail Program, it was an appropriate size for a pilot project and a baseline survey to be carried out successfully with the funds available, and a nutrition survey had been conducted there in 1992. It was also especially challenging in terms of the pilot project objectives. Food prices were unusually high in this community and the quality and supply of perishable food was known to be less than desirable. Therefore, if the pilot project could be successful in Fort Severn, it would be reasonable to expect success in other isolated communities.

Effective January 1, 2003, the rate for shipping the most nutritious perishable foods (designated as Priority Perishables) to Fort Severn was reduced from $0.80 to $0.30 per kilogram plus $0.75 per parcel. Priority Perishables include fresh milk (excluding chocolate milk), UHT milk, buttermilk, cheese, processed cheese, cottage cheese, yogurt, yogurt drinks, powdered milk, fresh vegetables, frozen vegetables (excluding French fries and similar potato products), fresh fruit, frozen fruit, frozen juice concentrate, eggs, cook-type cereals and whole wheat bread. The project also includes nutrition education on the use and benefits of these foods and retail promotion of healthy foods.

Food Supply System and Community Profile of Fort Severn

Fort Severn, located approximately 850 kilometres north of Thunder Bay, is a community with a 2001 Census population of 401 people, with 95 households and 90 census families. The Northern store and the Washaho General Store, a private retailer, obtain their perishable food from suppliers in Winnipeg. Some Winnipeg food suppliers also ship food directly to individuals in Fort Severn, using the Food Mail Program or air cargo service. Perishable food that is not eligible for shipment under the Food Mail Program would have to be shipped as regular air cargo or by charter at much higher rates.

Fort Severn is the most remote community in Ontario in terms of the supply of both perishable and non-perishable food. Perishables are trucked approximately 700 kilometres from Winnipeg suppliers to Pickle Lake, the "food entry point" for food shipped to this community under the Food Mail Program. Fresh and frozen food is normally received once a week. Non-perishable food is resupplied once a year on the barge service provided by Moosonee Transportation Limited from Moosonee. A winter road from Gillam, Manitoba, via Shamattawa, is normally in service for a few weeks and is also used for the resupply of staple food items.

Fort Severn's population increased by almost 20% (66 people) between 1991 and 2001. In the 2001 Census, the entire population identified themselves as North American Indian, although there appears to have been under-enumeration of both the Aboriginal and non-Aboriginal population. Thirty-seven percent of the enumerated population was under 15 years of age. While 44% of the population aged 15 and over were employed at the time of the 2001 Census, only 55 out of 250 adults (22%) had worked full-time throughout the previous year, compared to 35% of adults in Canada as a whole who had done so. Education levels were generally low. For example, about 78% of women aged 20 to 44 had not completed high school. Because of the low levels of full-time employment and education, the median census family income for the year 2000 was approximately $37,000, compared to about $55,000 in Canada [19].

Food Costs and Affordability in Fort Severn

Just prior to the baseline nutrition and food security surveys conducted in December 2002, food costs in Fort Severn were very high [16]. Prices of certain foods in October at the Northern store, the only store selling food at the time, were as follows:

Regular hamburger, per kg	$10.99	Eggs, large, dozen	$3.85
Wieners, 450 g	$3.99	Evaporated milk, 385 mL	$1.95
Chicken legs with backs, per kg	$6.29	Bread, 570 g	$2.99 to $3.45
Frozen French fries, 1 kg	$5.29 to $6.65	Milk, 1 L, UHT	$3.49*
Frozen vegetables, 1 kg	$5.50 to $7.89	Cheese, medium cheddar, 227 g	$5.09
Apples, per kg	$4.43 to $5.39	Flour, 5 kg	$8.75 to $12.79
Bananas, per kg	$4.53	Lard, 1.36 kg	$7.49
Potatoes, 2.27 kg	$7.46 to $8.23	Pop, 355 mL can	$1.35 to $1.45
Carrots, 907 g	$4.73	Frozen orange juice concentrate, 355 mL	$3.59

* Fresh milk was $3.99 to $4.09 for 1 L. Larger sizes were not available at the time of the survey.

In 2002, the cost of perishables in a 46-item Northern Food Basket that would feed a family of four for a week was $139, almost double that of Ottawa or Winnipeg ($72). Priority Perishables, as defined for the pilot project, cost $79, compared to $42 in Ottawa. The total cost of this basket was $275 in Fort Severn, $151 in Ottawa and $172 in Winnipeg [16].

To provide an objective measure of food affordability in Fort Severn at the time of the baseline survey, the after-shelter income of a two-parent family of four, with two children aged 8 and 14, living entirely on income support (social assistance) can be compared with the cost of the Northern Food Basket for a family of this size and type. In December 2002, this family would have been eligible to receive the following amounts: basic income support of $414 ($612 minus the clawback of the National Child Benefit Supplement), the Basic Federal Child Tax Benefit of $191.83, the National Child Benefit Supplement (NCBS) of $198.34, the Northern Allowance of $280, the Ontario Sales Tax Credit of $25, and the GST Credit of $54.17 per month (paid quarterly), for a rounded total of $1,163. The monthly food cost for this family would be $1,191, or 102 percent of their after-shelter income. After purchasing this food basket and paying rent, heat and electricity, assuming these costs are fully covered by their shelter allowance, they would be short $28 and have no money left for other purposes.

The number of social assistance cases in Fort Severn in December 2002 was 41 (32 Ontario Works "Regular" cases and 9 Sole Support recipients). The monthly average caseload for fiscal year 2002-2003 was 58. Persons aged 18 and over would be treated as a separate "case", even if they lived with parents or other family members.

Survey Objectives

1. To evaluate the food purchasing patterns and food security status of households in Fort Severn prior to the implementation of the pilot project on January 1, 2003.
2. To assess nutrient intakes and the general health status of First Nation women of child-bearing age in Fort Severn at that time.

Survey Design and Methodology

Sample Selection

Since there were very few non-First Nation residents in Fort Severn and their food security and food consumption patterns would be different from those of the First Nation population, the Council decided to include only First Nation members in the survey.

Participants were identified through a community list provided by the Fort Severn First Nation. All households were included in the household survey. All First Nation women aged 15 to 44, including pregnant and lactating women, with the exceptions noted below, were included in the nutrition survey. This population group was selected for the nutrition survey because it is at high risk for nutritional problems, and the health of women of child-bearing age has an important impact on the health of their children and, therefore, of the community.

For the Nutrition Questionnaire the following exclusions applied:

- interviewers;
- women within one week of childbirth, most of whom would be outside the community during this time;
- women non-resident in the community (away at school, for example); and
- women who were ill during the entire time of the survey, such that their food consumption was affected. For short duration acute illnesses, interviewers attempted to reschedule the interview upon recovery.

All participants were assigned an identification number to identify the household and individual. An information form in English and Cree was provided to all participants and all eligible participants were asked to sign a bilingual consent form for each questionnaire. At the completion of the survey, participants were eligible for a $10 food voucher for each completed questionnaire. The local survey coordinator gave a radio presentation to explain the purpose of the Food Mail Pilot Project and of the survey, the date when the new Food Mail rate for Priority Perishables would be introduced, which foods would be included in this special rate and how the results would be handled. She also explained that interviewers had sworn an oath of confidentiality and described the measures we were taking to protect the confidentiality of their responses.

Assessment Tools

Questionnaires were reviewed with the health director and council for cultural relevance and sensitivity and to ensure a comprehensive list of traditional foods on the Food Frequency Questionnaire.

Household Questionnaire

In earlier pilot project surveys, the Household Questionnaire was administered to the individual responsible for most of the food purchases in each household. In Fort Severn, it was common to have more than one family per household and for each family to purchase their own food. In addition, there were often other adults living in the same house purchasing their own food. Therefore, the Household Questionnaire was administered to each family and to other adults who purchased food for themselves. In the report, however, we have referred to both families and other adults purchasing food for themselves as "households".

The Household Questionnaire included questions on the following:

- whether they had purchased selected foods, including certain Priority Perishable foods, over the previous four weeks;
- where certain foods were usually purchased (Northern store, Washaho, by Food Mail, by air cargo or other);
- perception of the quality of certain Priority Perishable foods;
- perception of the variety and price of fresh fruits and vegetables;
- reasons for not buying fresh fruit and vegetables and fresh milk;
- the 18-item U.S. Food Security Survey Module with minor modifications to improve acceptability among the First Nation population. Modifications adopted

for the Alberta Northern River Basins Food Consumption Survey and used in the Fort Severn survey included: (a) instead of asking if the statements were "always true", "sometimes true" or "never true", the respondent was asked if this happened "often", "sometimes" or "never" and (b) changing "balanced meals" to "healthy meals". The former modification avoided possible questioning of the respondent's truthfulness in the answers given. The latter modification acknowledged that "healthy" was more meaningful to the Aboriginal population than "balanced". Surveys among Inuit women in Nunavut and Nunavik brought further modifications to the instrument. As a result of discussions with the Inuit interviewers, the statements regarding food security were prefaced with the phrase, "Some families might say". This approach was considered to be less direct and more culturally acceptable to the Inuit and was endorsed by the Fort Severn First Nation interviewers.

- reasons for being unable to afford enough food;
- actions taken when there was not enough money to buy food;
- access to traditional food and school food programs;
- degree of concern about specific social issues (running out of money to buy food, alcohol and drug abuse, the safety of traditional food, family violence, lack of jobs, and access to traditional food). This question helped to provide a context within which the perception of the severity of concern about food security could be considered vis-à-vis other social issues.
- socio-demographic factors relating to household size, ethnic status, sources of income, income of households not receiving social assistance, and expenditure on food and other necessities.

Nutrition Questionnaire

The Nutrition Questionnaire included:

- a 24-hour diet recall administered to 66 women;
- a second 24-hour recall administered to 45 women to permit a statistical correction for within-person variation in nutrient intakes;
- a modified Food Frequency Questionnaire covering a total of 94 foods, including traditional food, Priority Perishable food, Convenience Perishables, selected Non-perishable foods and Foods of Little Nutritional Value. A number of steps were taken to reduce respondent burden on the Food Frequency Questionnaire. Individual food consumption frequency was only asked about fruits and

vegetables commonly consumed in First Nation communities. After questions about some specific fruits and vegetables, participants were asked to select the five most frequently eaten from a series of photographs, and to indicate how often these foods were consumed in the past month. The use of photographs also avoided any misunderstanding which might arise from translation.

- questions on perceived health status, lifestyle (i.e., smoking, pregnancy and lactation status, activity level), medical conditions affecting diet, and anthropometric measurements (height, weight, waist and hip circumference). For participants who did not know their height and weight, weight, height and waist measurements were recorded at the health centre. Questions relating to perceived health status and smoking were included in order to provide a context within which food security and nutrient intakes could be considered. Information on smoking permitted a more accurate evaluation of the requirement for vitamin C, which is higher for smokers. The cost of cigarettes must also be considered a factor in food insecurity. Perceived health status is a well-recognized indicator of population health and, therefore, is relevant to the issue of food insecurity and nutrient intake.

Interviewer Training and Data Collection

Interviewers were selected by the local survey coordinator and provided with five days of training by the project nutritionist in survey objectives and methodology, protecting confidentiality and minimizing refusals. Special attention was given to the proper use of food models and the standardized procedure for conducting a 24-hour diet recall. Other topics included reading labels and details of some of the foods sold in the local stores.

Data collection took place over a three-week period in early December 2002. Bilingual response cards were used for the questions on income, activity level and food security statements. Photographs of fruit and vegetables were used to enable respondents to quickly identify foods purchased or consumed, and package labels were used to clearly distinguish between fruit drink crystals with and without vitamin C, and between fruit juice and fruit drinks. Nutrition Canada graduated food models were used to describe portion size.

Data Analysis

Household data were entered into Excel and then into the R Statistical System for analysis. Means and frequencies were calculated for each question. Families were divided into three socio-economic groups (Social Assistance, Working Poor and Relatively Well-Off), based on household income and size. The division into Working Poor and Relatively Well-Off groups was based on the Statistics Canada Rural Low Income Cutoff (LICO) numbers applied to reported income [20].

Food security status was analysed according to socio-economic group using the Fisher exact test, which gives exact statistical results for small sample sizes. Twenty-four-hour recall data were entered into the nutrition evaluation program of Micro Gesta Inc. Nutrient data for most foods were based on the Canadian Nutrient File 2001 (CNF), modified to reflect the most recent folic acid values. To arrive at the Dietary Folate Equivalents (DFE) for each food, food folate was calculated by subtracting folic acid values from folacin. This value was then added to folic acid multiplied by 1.7 to produce DFEs for each food. Nutrient data for traditional foods not included in the CNF were based on the published data of Kuhnlein and the Alaska Area Native Health Service [21] [22] [23]. Recipes were adapted from the United States Department of Agriculture (USDA) recipe file using CNF data and published traditional food values. Foods were categorized into 13 food groups and six Food Mail categories.

Nutrient data were then exported into a text file for analysis. In order to determine the percentage of a population whose usual intake of a nutrient is below the Estimated Average Requirement (EAR), it is necessary to estimate the distribution of usual intakes among individuals [24]. The usual intake for a group cannot be determined from 24-hour recall data without calculations that disentangle between-individual and within-individual variation. Because daily intakes of nutrients are generally not normally distributed, a complex set of adjustments and transformations is required.

In the current study, the required adjustments and transformations were performed using the C-SIDE software, which is based on the work of Nusser [25]. Specifically, the C-SIDE software was used to:

1. apply a power transformation to make the distribution of the 24-hour recall data more symmetric;

2. make adjustments to the data to account for variations between initial and subsequent 24-hour recalls and the day of the week the interview was conducted;
3. apply a semiparametric transformation to further normalize the data; and
4. estimate the distribution of usual intakes.

This program generates an adjusted mean and median for energy and nutrients. In cases where an EAR is known, and where the distribution of requirements among individuals was known to be symmetric, the percent of women below the EAR for women 19 to 30 was determined using the EAR cut-point method [24]. This percentage is considered to have a usual inadequate intake.

Since the distribution of requirements for iron is non-symmetrical, the EAR cut-point method is not appropriate for determining the probability of inadequacy. Therefore, the probability approach was used [24]. In this calculation, distribution percentiles generated by the C-SIDE program for iron were used in conjunction with probabilities of inadequate iron intakes to estimate the percentage of the population with an inadequate intake. These probabilities and ranges were based on data on usual intakes for a mixed population of women using and not using oral contraceptives derived from the Continuing Survey of Food Intakes by Individuals, 1994-1996 [26].

To calculate the simple mean energy and nutrient intake and mean intake by food group and Food Mail category, the first and repeat recalls were averaged for each respondent who completed two recalls and combined with the data from women who completed only one. Mean energy and nutrient intakes were then calculated for the population, by food group and Food Mail category. Frequencies were determined with Epi Info 2000.

Linear statistical modelling analysis (i.e. T-tests, Fisher exact test) was used to examine relationships between socio-economic group and food security, the intake of key nutrients and the consumption of Priority Perishables (based on the mean intake of vitamin A and folate from these foods), energy intake versus BMI and age, and traditional food consumption versus age group (15 to 24 and 25 to 44). Due to the small sample size, no adjustments were made for confounding variables. For most analyses, plots were examined graphically in order to identify unusually high or low values.

Preliminary results were discussed in a meeting with a community advisory group including the interviewers, the Pilot Project Coordinator, the nursing staff, the local Northern store manager and the Field Specialist with the North West Company as well as in a meeting with Council members and the Nurse-in-charge. The purpose of these meetings was to verify our findings and ensure that the questionnaire on food security was well understood, particularly the more severe aspects of food insecurity such as cutting down on the size of meals or going hungry because they were unable to afford enough food to feed their family.

Methodological Considerations

Food Security Questionnaire

The 1992 INAC nutrition survey indicated that food security was perceived as a problem by First Nation women of child-bearing age [2]. However, the questions did not assess the severity of the problem.

To date, no instrument has been validated to measure food insecurity among Aboriginal populations that depend in whole, or in part, on hunting or fishing for food. However, the most widely validated tool available to measure food insecurity is the U.S. Food Security Survey Module Questionnaire [27]. This instrument has been validated in a number of annual national surveys in the United States, including the Current Population Survey. This 18-item questionnaire evaluates the severity and prevalence of food insecurity and enables a classification of households by food security status. The score depends on the number of food insecure conditions the household reports. The questions are arranged (with a few exceptions to improve readability) so that each question reflects an increasing degree of food insecurity. Responses are then combined into ranges of severity, from a score of 0 to 2, or "food secure", to a score of 6 to 10, indicating "food insecure with hunger". The questionnaire builds on the work of Radimer and colleagues at Cornell University who developed an instrument to measure food insecurity among low-income women [28], and has now been used in a number of national American surveys, in the Northern River Basins Food Consumption Survey in Alberta, as well as in third-world countries. This methodology has also been used to compare the effects of cultural differences on the measurement of food insecurity and hunger [29]. According to Mark Nord of the USDA Economic Research Service, the modifications made to the questionnaire to improve cultural acceptability for a First Nation population did not affect the scaling.

It is important to remember that this questionnaire reflects "household" food security status, and not necessarily the status of any individual within the household. It is also based on experiences over the previous 12 months, and may not relate to the income over the previous month or to the nutrient intakes of women over the previous 24 hours.

Assessing Usual Intake

The 24-hour recall is the most widely used instrument to evaluate energy and nutrient intake. Estimating the usual intake of a group is complicated by large variations in intake from day to day, between individuals and by season [30], the degree of variation differing among nutrients [31 32 33 34]. Individuals also vary in their requirements for energy and nutrients. For example, iron requirements vary widely among women of child-bearing age due to differences in menstrual flow. For most nutrients, an average of three or more 24-hour recalls on non-consecutive days is considered sufficient to produce a reasonably accurate estimate of intake for an individual. In order to produce reasonable results for a group, at least some individuals (a minimum of 40) need to be interviewed at least twice in order to perform the necessary calculations to estimate the distribution of usual intakes [25].

The Canadian Recommended Nutrient Intakes (RNIs) and American Recommended Dietary Allowances (RDAs) were set with a safety factor above typical requirements, so that if a group had a mean intake equal to the RNI or RDA, you could be reasonably confident that their usual intake exceeded the individual requirements of most individuals in the group.

The new Dietary Reference Intakes (DRIs) represent a more complex set of values developed for different planning or assessment purposes. With these new values, the RDA is defined as "the average dietary intake level that is sufficient to meet the nutrient requirement of nearly all healthy individuals in a life stage and gender group" [24]. Comparison of the mean intake of a group with the new RDAs and the conclusion that diets are adequate if they meet or exceed the RDA are inappropriate because the prevalence of inadequacy depends on the shape and variation of the "usual" intake distribution, not on mean intake. If group mean intake equals the RDA, there will be a substantial proportion of the group with usual intake less than their requirement [24].

An estimate of inadequate intakes for a group is now based on the percentage below the EAR (i.e., the median daily nutrient intake level estimated to meet the requirement of half the healthy individuals in a particular life stage and gender group within the general North American population) [24]. The percentage below the EAR may be calculated using a program such as C-SIDE software, which performs the necessary adjustments to estimate the distribution of usual intakes [25].

The establishment of the EAR takes into account the reduction in the risk of chronic degenerative diseases in addition to the prevention of nutrient deficiencies. The EAR can be used to examine the probability that an individual's intake is inadequate. As mentioned above, it can also be used to estimate the prevalence of inadequate intakes within a group. Since the EAR, by definition, only meets the requirements of half of the individuals in a group, it cannot be used as an intake goal for individuals. The RDA, which is calculated from the EAR by taking this value and adding 2 standard deviations, thus exceeding the requirements of 97.5% of the individuals in the group, is the appropriate goal for individuals. The EAR is used to plan for an acceptable prevalence of inadequate intakes within a group.

The 24-hour recall data were collected from women aged 15 to 44. Ideally, the results would be analysed according to three separate age groups (14 to 18, 19 to 30 and 31 to 50) for which EARs have been estimated. However, the small sample size made this impossible. Instead, we selected the EARs for women aged 19 to 30, based on a mean age of 30. This methodology may result in an under- or overestimate of nutrient requirements, depending on the age of individuals and the respective requirement.

The validity of the 24-hour recall depends on the respondent's memory and ability to recall portion sizes. Furthermore, the validity is affected by certain respondent biases. Respondent errors may include under- or over-reporting and the influence of social desirability. Under-reporting of energy intake appears to affect as many as 25% of dietary records [35]. In a number of studies, BMI has been found to be a predictor of under-reporting [36 37 38 39 40], with women tending to under-report more than men [40 41]. Social desirability also affects under-reporting, especially of macronutrient intake [37 38 39 42]. Under-reporting of energy intake by social desirability trait was found to be higher among women with less than college education than among those with college education [42].

Both the co-operation of the respondent and her ability to accurately recall food consumption are influenced by the interviewer's skill with the instrument. The interviewer must be able to prompt memory, without suggesting an appropriate response. The instruments used to describe portion size play an important role, since the portion size of some foods may be more difficult to estimate than others. Household measures such as cups, spoons, etc., do not allow for slight differences in amounts and they are difficult to use for foods of irregular shape or cooked mixtures which are mounded on a plate. Standardized graduated food models improve the accuracy of recalling portion size by providing a range of choices. For certain nutrients, accurate recall of portion size is critical. For example, since fat is a concentrated source of energy, a small underestimate in portion size would result in a significant underestimate of energy intake.

Conducting 24-hour recalls in a single season ignores important seasonal differences in the consumption of traditional food and some store foods as well. Nutrient intake may also vary seasonally, especially for nutrients such as vitamin A, vitamin D, cholesterol and linoleic acid, all of which are concentrated in a few foods. Comparison of the results of this survey with the previous INAC survey of women in Fort Severn may also be difficult, since the earlier survey was conducted in the spring.

Finally, the results of a 24-hour recall may suggest areas of concern for the community or specific groups and educational needs, but individual assessment of nutritional status and health would require clinical and biochemical investigation.

Food Frequency Questionnaire

The Food Frequency Questionnaire (FFQ) is generally used in large epidemiological studies as a means of ranking individuals in terms of risk of chronic disease according to their consumption of certain foods, and may provide information on the variety of food consumed over a longer period than a 24-hour recall. However, it has a number of inherent problems, including the respondent's ability to report consumption over the selected time period. Since respondents may have difficulty estimating frequency and portion size over a long period, they tend to overestimate consumption and report their routine or typical diet rather than the specifics of what they ate over the period in question [43]. Comparison of the Block FFQ and the Harvard FFQ with 24-hour recalls found that both instruments overestimated intakes of protein, calcium, vitamin A and vitamin C. The Harvard questionnaire also overestimated energy intake, whereas the Block questionnaire overestimated iron intake [44]. While the FFQ tends to overestimate food consumption, it does provide information on how frequently foods are consumed over a specific period. For these reasons, the FFQ used in the current study asked only about the frequency of consumption, not the usual quantities consumed.

The validity of the FFQ could be improved by basing it on a 24-hour recall, if this information were available, and by modifying the format to be more culturally sensitive in terms of the order of foods. Alternatively, the questionnaire could be reviewed by local representatives to select the most important foods and the most appropriate order. In this case, the questionnaire was reviewed by local representatives to ensure that the most important foods were included.

Neither the 24-hour recall nor the FFQ, by themselves, have the capacity to determine what proportion of a group has an inadequate or excessive energy intake, since both instruments may be affected by under- or over-reporting, and do not take activity level into account. Instead, the BMI, in addition to detailed information on activity level, is used for this purpose.

Household Survey Results

Household Size and Composition

Household composition is presented in Table 1. There were 134 First Nation households and 224 First Nation adults, 67% of whom were between 18 and 44 years of age and 15% between 45 and 59. There was a total of 161 children, and an average of 1.3 children per household. Thirty-four percent of children were aged 5 or under, and 43% were between 6 and 12 years of age.

Table 1. Household composition, Fort Severn, 2002

Total number of households		134
Number of households where food purchaser was unavailable or out of town		11
Total number of households surveyed		121
Refusal rate (%)		2
Age of First Nation adults	**Number**	**%**
Between 18 and 44	149	67
Between 45 and 59	34	15
Between 60 and 64	18	8
65+	23	10
Total	224	100
Age of First Nation children	**Number**	**%**
Children 5 or under	55	34
Children 6 to 12	69	43
Children 13 to 17	37	23
Total	161	100
Average number of children per household	1.3	

Source and Amount of Income and Expenditure on Food

Thirty-nine percent of households had received social assistance and 13% Employment Insurance in the past month (Figure 1, Table 2). Sixty-one percent of households reported earning money from a job or business (Figure 2, Table 2).

Forty-three percent of households not receiving social assistance reported an income of $1500 or less and 38% between $1501 and $3000 for the past four weeks (Table 2). Approximately three quarters of households reported that their income in the previous month was the same as their usual income. The average weekly food expenditure for First Nation households was $330.

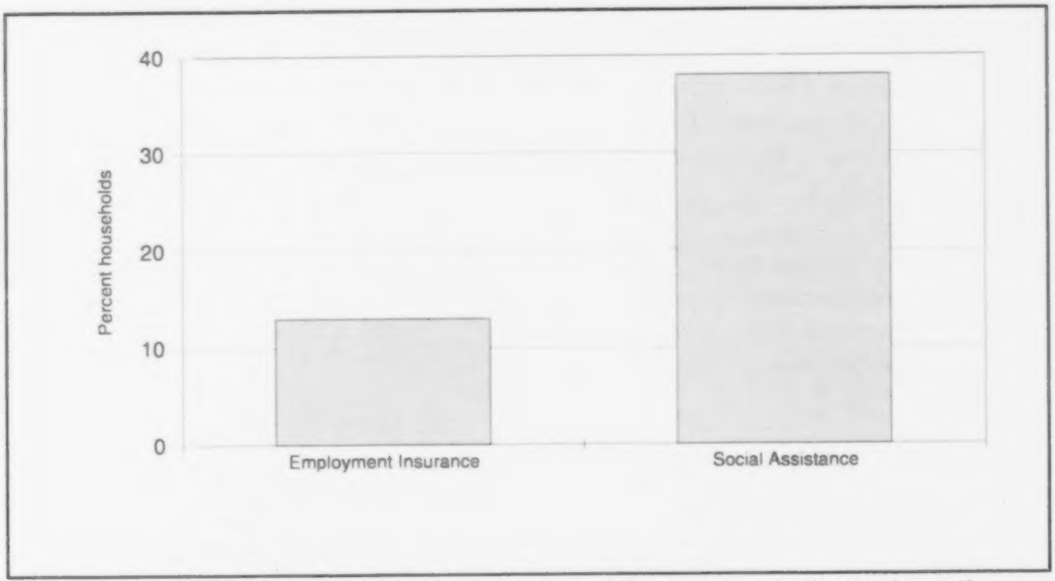

Figure 1 Percent households receiving financial assistance in the past month, Fort Severn, 2002

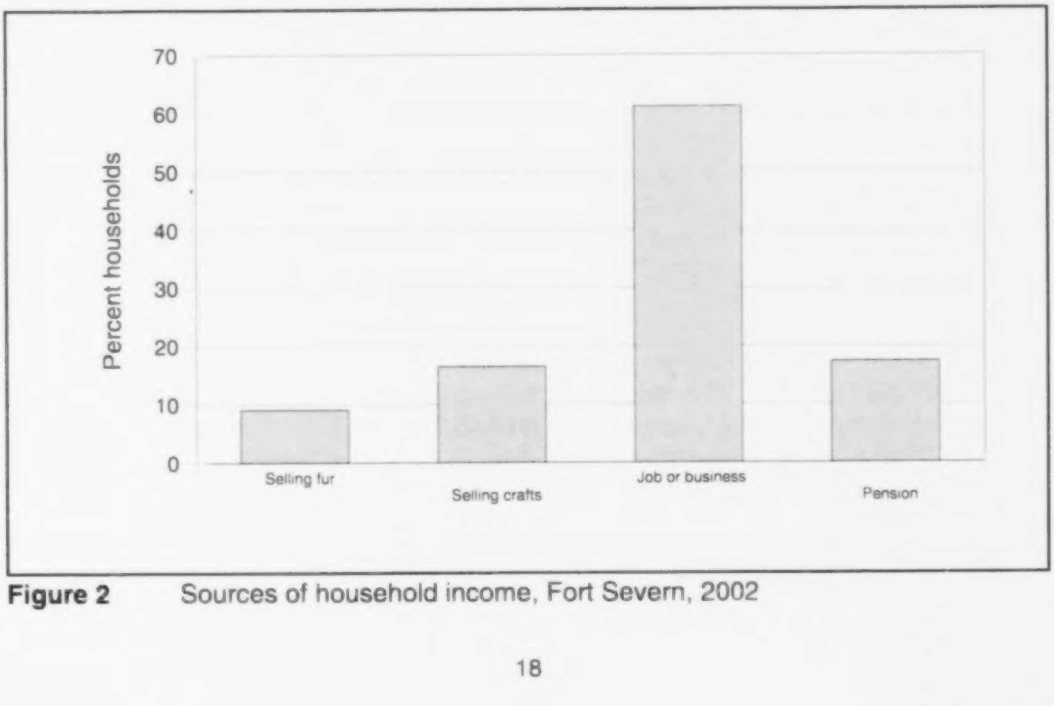

Figure 2 Sources of household income, Fort Severn, 2002

Table 2. Household income and expenditures, Fort Severn, 2002

Percent households earning money from different sources (n=121)	%
Selling fur	9
Selling crafts	17
Job or business	61
A pension	17
Households receiving financial assistance in the past month	%
Percent receiving Employment Insurance (n=120)	13
Percent households receiving social assistance (n=119)	39
Total household income[1] of households not receiving social assistance in the past four weeks (n=74)	%
$1500 or less	43
$1501 to $2000	16
$2001 to $3000	22
$3001 or more	19
Reported income compared to usual income (n=117)	%
Same	73
More than usual	14
Less than usual	8
Don't know	5
Average weekly food expenditure	$330

[1] Income includes take-home pay from a job, money from selling furs or crafts, pensions, net income from running a business and Employment Insurance.

Food Security

The extent and severity of household food insecurity was measured with the U.S. Food Security Survey Module. The 18-item food security questionnaire asks about conditions, experiences and behaviours characteristic of a wide range of severity of food insecurity and hunger experienced over the past 12 months (Appendix B). The first two questions reflect uncertainty about having enough food and the experience of running out of food. The remaining items are arranged in increasing order of severity, screening out food-secure participants early in the process.

In the general American population, food insecurity follows a progressive scale of severity, such that adults will report doing without before obvious behavioural signs of food insecurity are reported for children. However, in this survey, children were affected by household food insecurity at nearly the same level of severity as were adults. This pattern was also typical (although not as marked) of surveys conducted among other North American Aboriginal groups [29 45]. For this reason, the results for the 10-item adult/household scale and the 8-item child scale are presented separately (Table 3).

Households classified as "food insecure" reported anxiety about having adequate food to feed the family, running out of food, and perceptions that the food eaten by adults or children was inadequate in quality or quantity. Households classified as "food insecure with hunger" reported, in addition, behaviours such as cutting down on the size of meals, eating less than they felt they should, not eating for a whole day, and being hungry because there wasn't enough money for food.

On the 10-question adult scale, three or more affirmative responses are required for a household to be classified as "food insecure without hunger". In Fort Severn, most food insecure households reported a larger number of these conditions. Six or more affirmative responses to adult-referenced questions are required for a household to be classified as "food insecure with hunger".

Children's food security status is calculated from the eight questions that ask specifically about food conditions among children in the household. The first three child items reflect disrupted eating patterns or reduced quality and variety and identify children who are "food insecure" or "have a restricted diet" in this analysis. "Food insecure with hunger" refers to the more severe items on the child scale, namely skipping meals because there wasn't enough money for food, doing so at in least three months in the past year, going hungry and not eating for a whole day. Two or more affirmative responses to child-referenced questions are required for a household to be classified as having food insecurity among children and five or more affirmative responses to be classified as "food insecure with hunger".

Adults were experiencing food insecurity without hunger in 41% of First Nation households in Fort Severn. Adults in 32 households (26%) were "food insecure with hunger" (Table 3, Figure 3). On the children's food security measure, children were food secure in only 31% of First Nation households, 45% were food insecure without hunger and in 24% of households, children were hungry at times because the household could not afford enough food (Table 3, Figure 3).

Table 3. Food security, First Nation households, Fort Severn, 2002

	Number	%
Adult food security (n=121)		
Food secure	39	32
Food insecure without hunger	50	41
Food insecure with hunger	32	26
Children's food security among households with children (n=62)		
Food secure or only one child-related food security problem	19	31
Food insecurity without hunger ("reduced quality or variety of children's diets")	28	45
Food insecure with hunger	15	24
Food security of adults and children in households with children (n=62)		
Food secure – both adults and children	16	26
Food insecure without hunger – adults or children or both	21	34
Food insecure without hunger – both adults and children	18	29
Food insecure with hunger		
Hunger among adults or children or both	17	27
Hunger among both adults and children	11	18
Hunger among adults but not children	6	10
Hunger among children but not adults	0	0

Note: Food security was measured using the U.S. Food Security Survey Module, modified following cognitive testing among First Nation interviewers. The results were analysed by Mark Nord, Economic Research Service, USDA. For this survey, the 10-item adult/household scale was used to describe conditions among adults and the 8-item children/household scale to describe conditions among children.

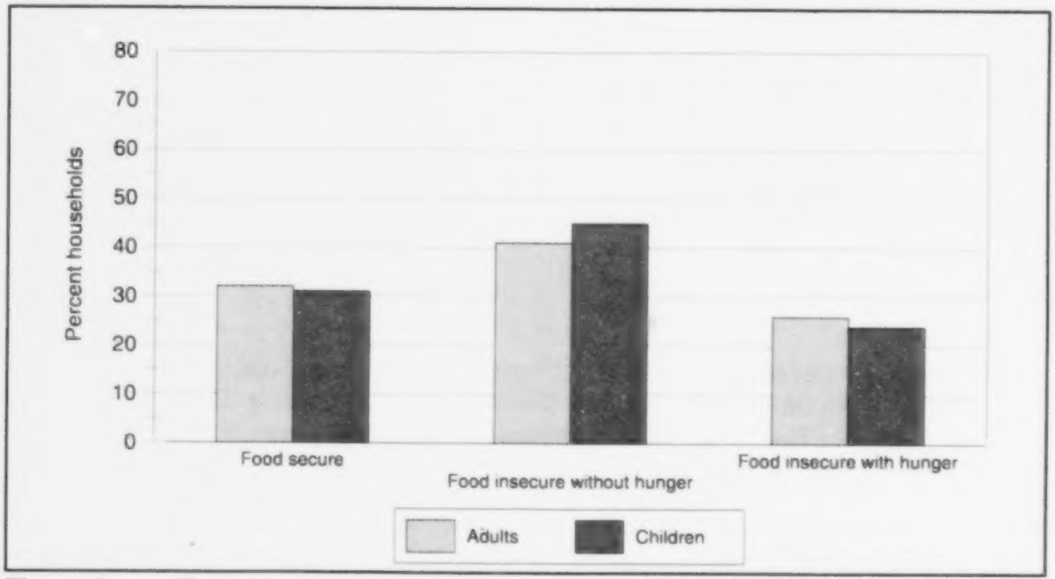

Figure 3 Food security status, First Nation adults and children, Fort Severn, 2002

Looking at both measures for households with children, both adults and children were food secure in only 26% of First Nation households. In 27% of households with children, adults, children or both were food insecure with hunger, and in 18% both adults and children were food insecure with hunger (Table 3). In 2001, 3.3% of households in the United States were food insecure with hunger [46].

Table 4 presents responses to individual questions by food security status. Approximately three quarters of all households had experienced anxiety about being able to afford enough food. Between 30 and 43% of all households experienced the more severe conditions, such as cutting the size of the meal, eating less than they should, and going hungry because they were unable to afford enough food. Adults in 13% of households did not eat for a whole day in three or more months because they were unable to afford food. In households with children, 11% reported that children did not eat for a whole day because they were unable to afford food. Thirteen percent of adults reported they had lost weight because there wasn't enough money for food. These conditions were more prevalent among households classified as "food insecure with hunger".

The frequency of occurrence of these conditions or behaviours provides additional insight into the severity of food insecurity (Table 5). Thirty-eight percent of families reported they often worried about being able to afford enough food, 36% often ran out of money to buy food and 31% often relied on few kinds of low-cost foods to feed their children. In 18% of households, children were often not eating enough because they were unable to afford enough food.

This level of food insecurity existed despite the fact that 82% of households had access to traditional food most of the time. However, children five and under received breakfast, lunch or snacks at day care, pre-school or kindergarten in only 35% of households, and children 6 to 17 received breakfast, lunch or snacks at school in only 26% of households (Table 6).

Having to pay bills, not enough income, the high cost of food and not working were the major reasons given for being unable to afford enough food. To cope with this situation, most First Nation households borrowed food or money from friends or family (66%), asked the store manager for more credit (54%) or went hunting or fishing (40%) (Table 6). The principal reasons why families were unable to get traditional food included the hunter working (36%), a lack of transportation and the cost of gas (31%), and the cost of repairs (24%) (Table 7).

Table 4. Responses to food security scale items, First Nation households, Fort Severn, 2002

Scale item	Households affirming item		
	All households (n=121)	All food insecure households without hunger (n=50)	All food insecure households with hunger (n=32)
		Percent	
Household items			
Worried food would run out before we got money to buy more	76	96	100
Food bought didn't last, and we didn't have money to get more	73	100	97
Couldn't afford to eat healthy meals	74	94	100
Adult items			
Adults cut the size of meals or skipped meals because there wasn't enough money for food	30	12	94
Respondent ate less than felt he/she should [1]	43	38	100
Adults cut size of meal or skipped meals in 3 or more months [1]	26	6	87
Respondent hungry but didn't eat because couldn't afford	32	26	81
Respondent lost weight [1]	13	6	41
Adults did not eat for a whole day [1]	15	4	47
Adults did not eat for a whole day in 3 or more months	13	2	47

Child items (for households with children)	All households (n=62)	All food insecure households without hunger (n=28)	All food insecure households with hunger (n=15)
		Percent[2]	
Relied on few kinds of low-cost foods to feed children [1]	74	96	100
Couldn't feed children healthy meals [1]	65	86	100
Children were not eating enough [1]	53	71	93
Cut the size of children's meals [1]	24	11	80
Children were hungry [1]	31	25	80
Children skipped meals [1]	24	7	87
Children skipped meals in 3 or more months	18	4	67
Children did not eat for a whole day [1]	11	0	47

[1] The actual wording of the item includes a specific reference to not being able to afford enough food.

[2] Households without children are excluded from the child-referenced items.

Table 5. Percent reporting frequency of occurrence of behaviours, experiences, and conditions affecting food insecurity, First Nation households, Fort Severn, 2002

	Frequency of occurrence		
Condition	**Often**	**Sometimes**	**Total (ever during the year)**
		Percent [2]	
Worried food would run out before we got money to buy more	38	38	76
Food bought didn't last and we didn't have money to get more	36	37	73
Couldn't afford to eat healthy meals	27	47	74
Relied on few kinds of low-cost food to feed children [1]	31	43	74
Couldn't feed children healthy meals [1]	24	41	65
Children were not eating enough [1]	18	35	53

	Frequency of occurrence				
	Almost every month	Some months but not every month	In only 1 or 2 months	Don't know/ missing	Total (ever during the year)
			Percent [2]		
Adults cut size of meals or skipped meals	12	13	3	1	30
Adults did not eat for a whole day [1]	10	3	2		15
Children skipped meals [1]	5	14	3	2	24

[1] The actual wording of the item includes a specific reference to not being able to afford enough food.

[2] Households without children are excluded from the child-referenced items.

Table 6. Reported reasons for food insecurity and remedial action taken, First Nation households, Fort Severn, 2002

Reasons for not being able to afford enough food (n=92)	%
Food costs too much	41
Had to pay bills (like hydro, children's clothing, school supplies)	76
Gave money away	3
Not enough income	57
Had to buy hunting, fishing or trapping equipment, supplies or gas	20
Not working	41
Spent money gambling	2
Waiting for Employment Insurance or social assistance	7
Gave food away to others in the community	1
Don't know or refuse	4
Action taken by First Nation households when they were unable to afford enough food (n=90)	**%**
Borrow food or money from friends or family	66
Go hunting or fishing	40
Make an item to sell	19
Do without	18
Ask store manager for more credit	54
Ask for more social assistance	12
Other	17
Percent households where children 5 and under received breakfast, lunch or snacks at a day care, pre-school program or kindergarten (n=34)	35
Percent households where children 6 to 17 received breakfast, lunch or snacks at school (n=47)	26

Table 7. Traditional food access, First Nation households, Fort Severn, 2002

Percent households with access to traditional food most of the time (n=117) 82

Reasons why households are unable to get traditional food (n=45)

	Number	%
No transportation	14	31
No hunter or fisherman in household	13	29
Hunter or fisher in family is sick/injured	5	11
Hunter or fisher is working	16	36
Gas too expensive	14	31
Repairs too expensive	11	24
Traditional food not available	0	0
Food not shared in community	2	4
No place to store traditional food	3	7
No hunting or fishing equipment	9	20
Medical reason	2	4
Total	89	

Note: Households could provide up to 3 reasons.

Food Security and Socio-economic Group

Table 8 shows the breakdown of First Nation households on the basis of socio-economic group.

Table 8. Distribution of respondents by socio-economic group, First Nation households, Fort Severn, 2002

	%	n
Received social assistance in past month	38	46
Working poor [1]	35	42
Relatively well-off	27	32
Total	100	120

[1] Working poor households: not on social assistance and household sizes 1, 2, or 3 with monthly income <\$1500; household size 4 or 5 with monthly income <\$2000; and household size 6+ with monthly income <\$3000.

The LICOs are used by Statistics Canada to identify Canadians in "straightened economic circumstances"[20]. Strictly speaking, these LICOs are not applicable to First Nation communities. They do not take into account the very high price of commercial food and other goods in the North. On the other hand, the LICOs do not consider the fact that many individuals have their housing costs subsidized, nor the fact that most families have access to traditional food. The rural LICOs are used here as a convenient way of producing two income groups of reasonable size.

As illustrated in Figure 4, 76% of families on social assistance were food insecure, and 35% experienced "food insecurity with hunger". The situation was a little less severe for working poor families, but 29% of adults were "food insecure with hunger". Although there was some hunger among adults in relatively well-off families, there was a clear decrease in food security with increasing socio-economic status ($p<0.05$ for the Fisher exact test). It is important to keep in mind that the U.S. Food Security Survey Module measures the extent and severity of food insecurity during any time over the past 12 months, while the reported income was based on the previous month.

Figure 5 shows that the results were similar for children ($p<0.05$).

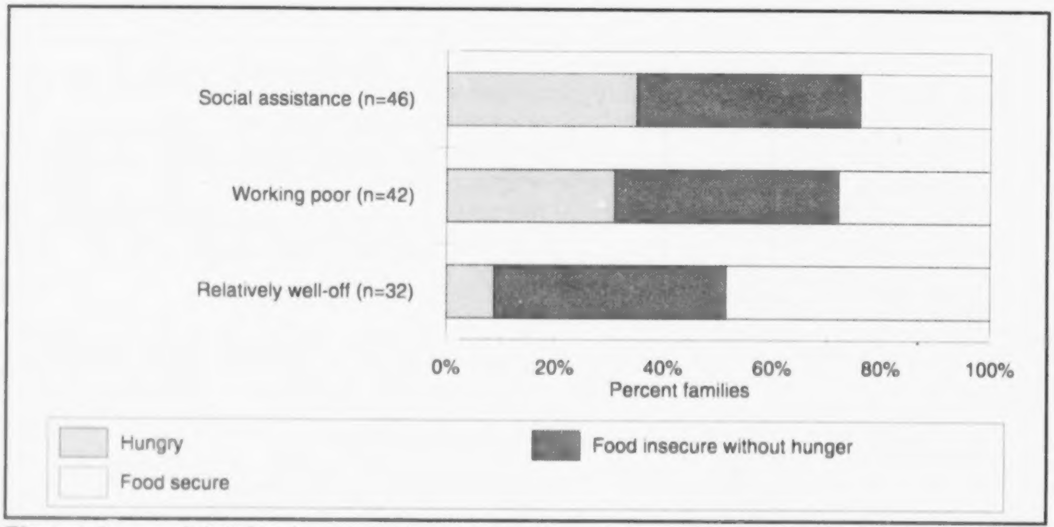

Figure 4 Adult food security by socio-economic group, First Nation households, Fort Severn, 2002

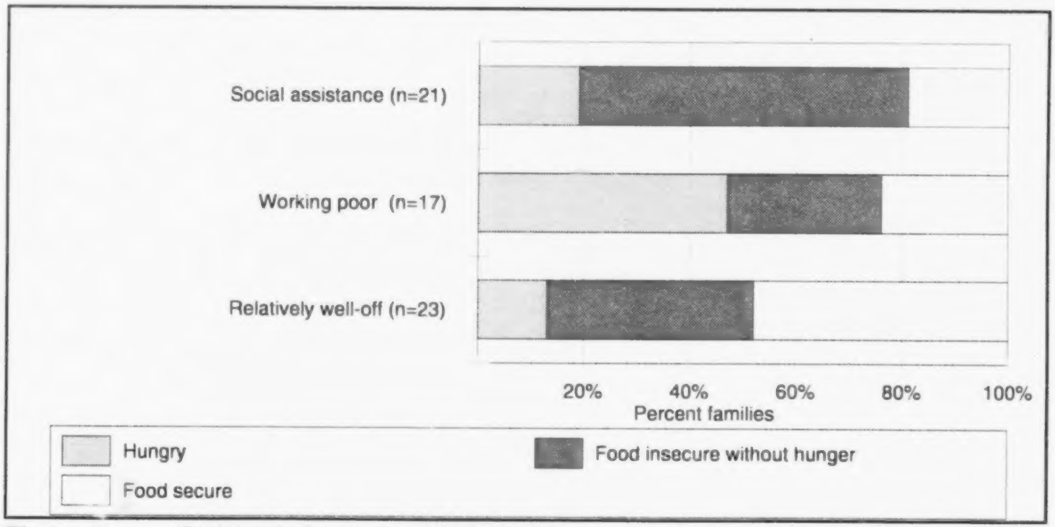

Figure 5 Children's food security by socio-economic group, First Nation households, Fort Severn, 2002

Social Issues of Concern

The four issues of greatest concern were the lack of jobs (80% "extremely concerned"), alcohol and drug abuse (55%), family violence (50%) and not having enough money for food (48%) (Figure 6). In 1992, a third of households in Fort Severn reported this level of concern about alcohol and drug abuse and 40% about not having enough money for food [2]. The relative importance of not having enough money for food adds further credence to the results of the food security questionnaire.

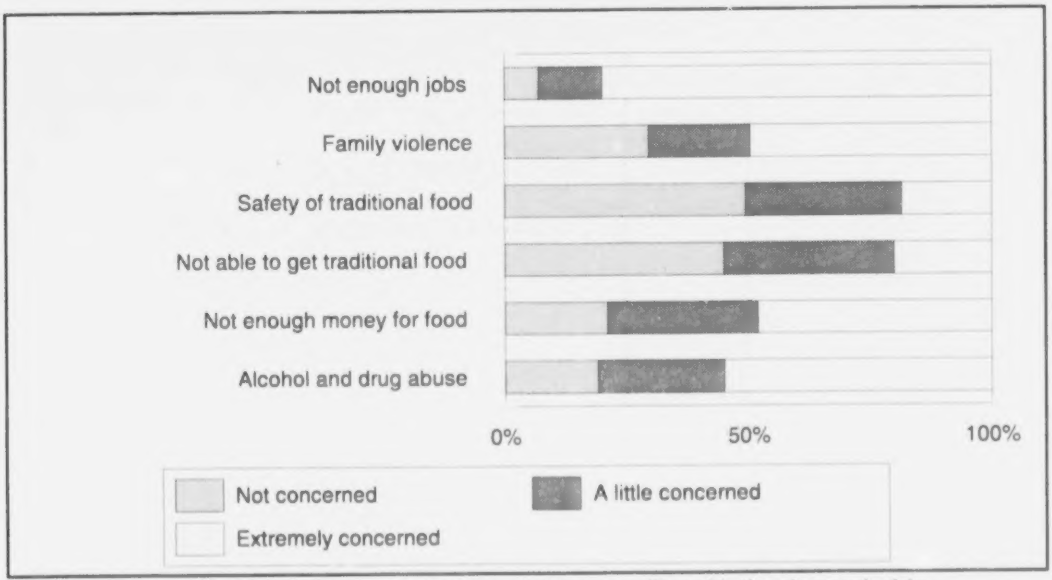

Figure 6 Degree of concern about social issues, First Nation households, Fort Severn, 2002

Food Purchasing Practices

Source of food purchases

Most households purchased their food at the Northern store. About 20 to 25% purchased specific items in the survey at both stores, and 4 to 12% bought specific items exclusively from the Washaho General Store. Five percent of households said they used Food Mail (2%) or air cargo (3%) to order meat from the south.

Perceptions of quality, variety and cost

Poor quality of fresh fruits and vegetables and fresh milk is clearly a problem in Fort Severn (Table 9, Figure 7). Sixty to 80% of households rated the quality of fruits and vegetables, including potatoes, as poor or fair. Over half rated the quality of bread and milk as fair or poor and 44% rated eggs in these categories.

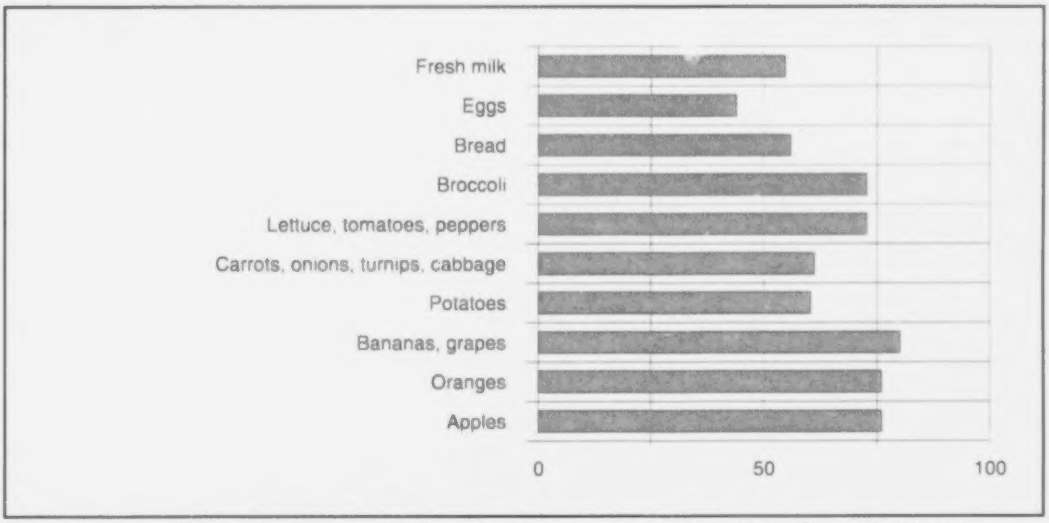

Figure 7 Percent of households rating foods poor or fair, Fort Severn, 2002

As Table 9 indicates, 40% of households considered the variety of fresh fruits and vegetables only "sometimes" adequate, and 47% considered variety was "never" adequate. Eighty-two percent of households found the price of fresh fruit and vegetables higher than last year.

Table 9. Perceptions of quality, variety and cost of perishable foods, First Nation households, Fort Severn, 2002

Quality of perishable foods sold in Fort Severn	n	Poor	Fair	Good	Excellent	DK	NA
		%	%	%	%	%	%
Apples	121	34	42	17	2	3	2
Oranges	121	31	45	19	1	3	1
Bananas, grapes	121	43	37	16	1	2	1
Potatoes	121	31	45	19	1	3	1
Carrots, onions, turnips, cabbage	121	18	43	31	4	2	1
Lettuce, tomatoes, peppers	121	24	49	23	2	2	1
Broccoli	119	22	46	19	1	9	2
Bread	120	13	42	38	6	0	0
Eggs	121	6	38	47	9	0	0
Fresh milk	121	21	33	38	4	2	2
Frozen store meat	121	20	50	23	6	0	1
Frozen vegetables	120	12	46	33	7	1	1
Other frozen food	121	14	53	29	3	1	0
Enough variety of fresh fruit and vegetables in Fort Severn (n=120)		%					
Always		0					
Most of the time		12					
Sometimes		40					
Never		47					
Price of fresh fruit and vegetables compared to same time last year (n=115)		%					
Higher		82					
Lower		0					
Same, no change		5					
Don't know		13					

Frequency of food purchases in the past four weeks

The most frequently purchased fruits included bananas, oranges and apples, purchased by 71 to 83% of households in the past four weeks. Among fresh and frozen vegetables, the most popular were fresh potatoes (75%), French fries (74%), lettuce and tomatoes (56%), onions (55%) and frozen mixed vegetables (51%). Approximately three quarters of households had purchased frozen pizza. Evaporated milk was clearly the most popular dairy product (83%), followed by fresh milk (75%). Cheese and ice cream were purchased by about half of households in the past four weeks. Frozen fruit juice was reported more frequently than frozen fruit drinks (39% versus 23%).

Approximately one third of households purchased less than 6 kinds of fruit and vegetables, 40% purchased between 6 and 10 fruit and vegetables and approximately one quarter purchased more than 10 in the past four weeks (Table 10).

Table 10. Percent of First Nation households in Fort Severn who purchased fresh fruits and vegetables in the past four weeks

	%
Less than 3 fresh fruits and vegetables	9
Less than 6 fresh fruits and vegetables	36
Six to 10 fresh fruits and vegetables	40
More than 10 fresh fruits and vegetables	24
Total (n=121)	100

The most important barriers to buying fruits and vegetables were cost (85%), poor availability (68%), poor quality (66%) and not enough variety (56%) (Figure 8). Very few respondents cited a greater preference for canned or frozen products, a dislike of the taste, a belief that these foods were unnecessary to good health, or a lack of knowledge regarding the preparation of these foods.

Cost (80%), availability (64%) and poor quality were also the major obstacles to purchasing more fresh milk (Figure 9). Forty percent reported that milk was sour and 43% that fresh milk had passed its best before date. Only 5% reported that they were unable to digest milk.

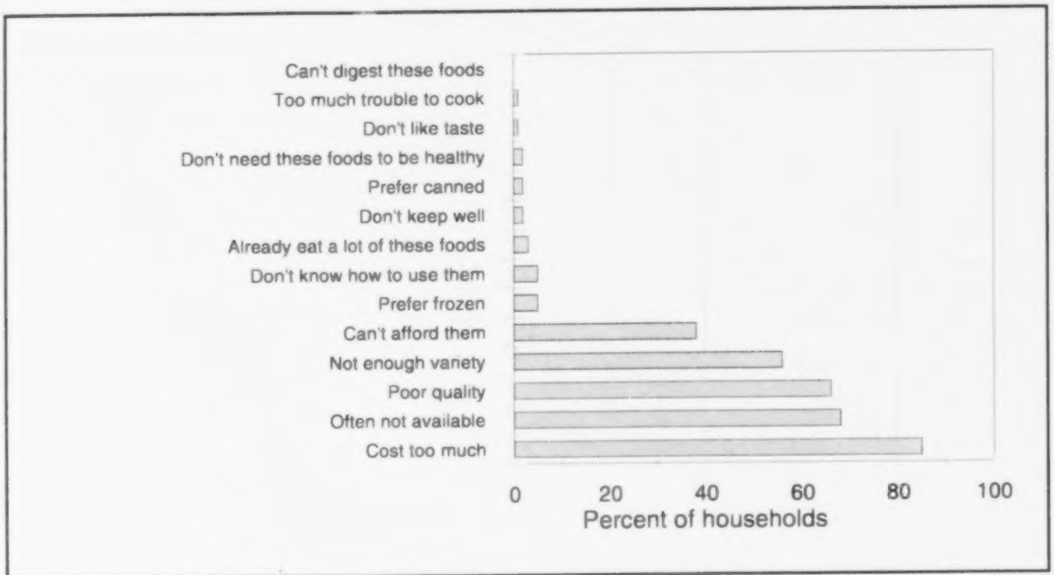

Figure 8 Reasons for not buying more fresh fruit and vegetables, First Nation households, Fort Severn, 2002

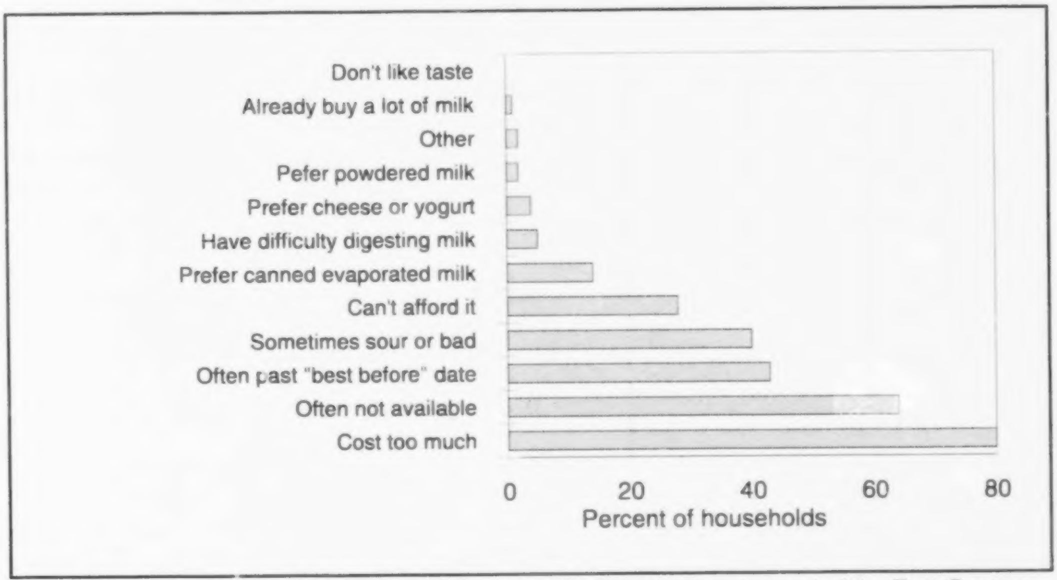

Figure 9 Reasons for not buying more milk, First Nation households, Fort Severn, 2002

Nutrition Survey Results

Respondent Profiles

Of the 77 eligible women aged 15 to 44, 66 agreed to participate, one refused and ten were unavailable. Three participants were pregnant and nine breastfeeding at the time of the survey. The distribution of ages among non-pregnant, non-lactating women was as follows: 15 to 18, 11%; 19 to 30, 37%; and 31 to 44, 52%. The mean and median ages for this group were 30 and 31, respectively.

Food Frequency Questionnaire

According to the Food Frequency Questionnaire, the most frequently consumed traditional foods in the previous month were, in descending order, caribou, goose, moose, caribou fat and trout (Figure 10).

The most frequently consumed store foods were tea, coffee, white bread, fresh or boxed milk, eggs and fruit drink crystals with vitamin C (Figure 11).

As Figure 12 illustrates, bananas, fresh fruit juice, oranges and canned fruit were eaten five or six times in the past month. The most popular vegetables, in descending order, were instant mashed potatoes, frozen French fries, fresh potatoes, canned corn and other canned vegetables, all of which were eaten about five times in the past month.

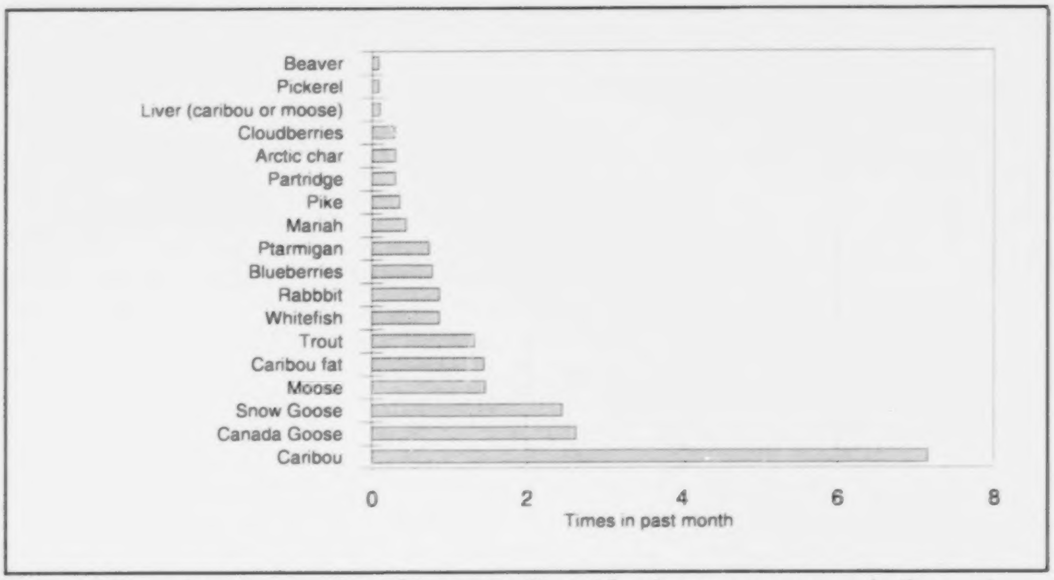

Figure 10 Average number of times traditional foods were consumer in the past month, First Nation women, Fort Severn, 2002

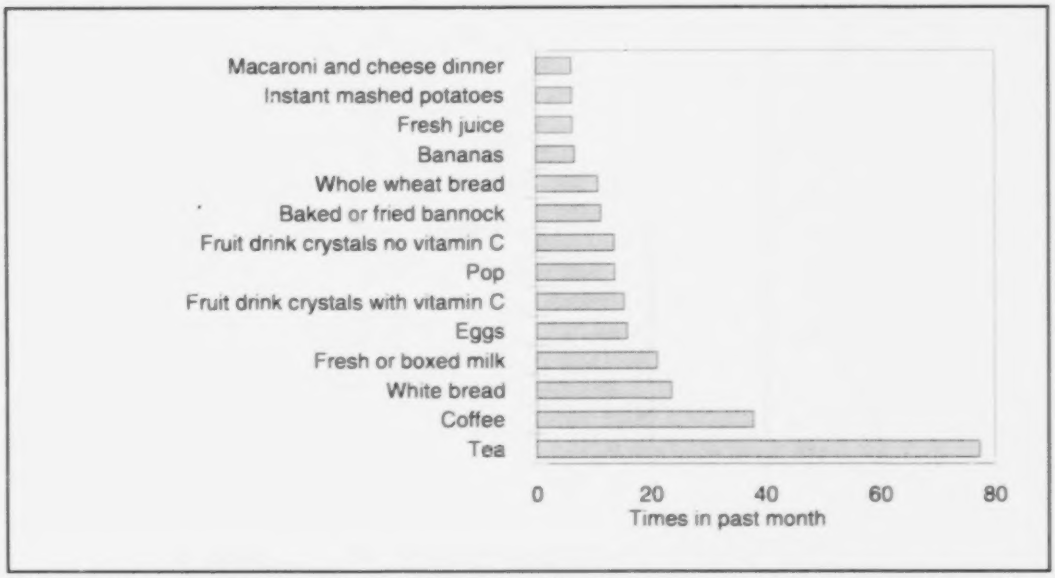

Figure 11 Average number of times store foods were consumer in the past month, First Nation women, Fort Severn, 2002

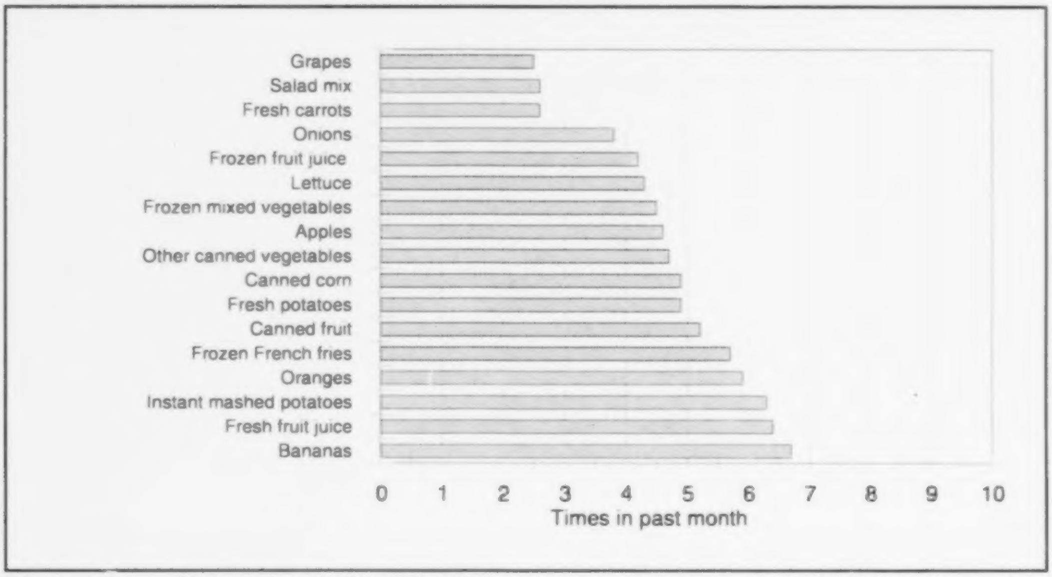

Figure 12 Fruit, juice and vegetables consumed most frequently in the past month, First Nation women, Fort Severn, 2002

Food Consumption Patterns (24-hour recall)

Traditional food

On the 24-hour recall, First Nation women, reported an average consumption of only 46 grams of traditional food per day and these foods were reported on only 31% of interview days. Traditional Meat, Birds and Fish accounted for only 30% of all Meat, Poultry and Fish. Caribou was clearly the most important food reported (an average of 33 grams), followed by small amounts of goose (6 grams), beaver, ptarmigan and fish (2 grams) (Figure 13). Traditional food consumption was only one quarter of that reported in 1992 [2]. According to community members who participated in the community discussion, there has been a decline in country food consumption in the past 10 years, partly due to the disruption of the caribou migration path that followed the construction of the winter road. They also felt that the supply of traditional food would be at its lowest at this time of the year and, therefore, not comparable with the previous spring survey.

Although most nutrition surveys of Aboriginal women living in isolated communities show a higher consumption of traditional food among older women [1 2], this study did not find a significant difference between women 25 to 44 and younger women, although the trend was in that direction.

Store foods

Dairy Products

An average of 135 grams of Dairy Products were consumed, representing about two thirds of a serving. Fluid milk (primarily 2%) accounted for 58% by weight of this food group and evaporated milk (primarily whole) 24% (Table 11).

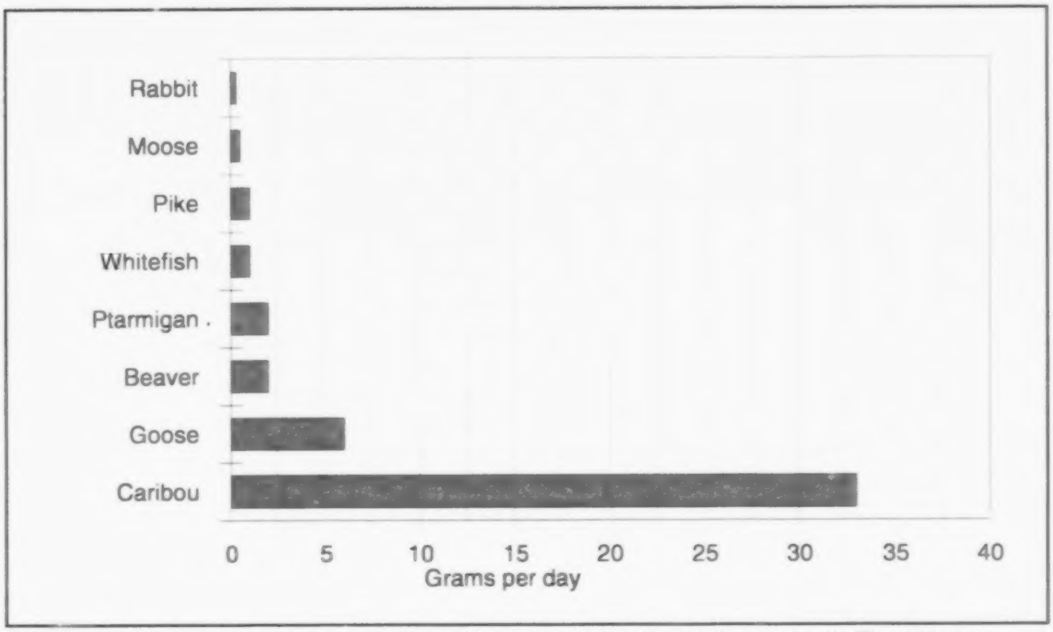

Figure 13 Average consumption of traditional foods, 24-hour recall, First Nation women, Fort Severn, 2002

Table 11. Mean daily amounts of Dairy Products consumed by First Nation women: 24-hour recall, Fort Severn, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Chocolate milk	11
	Ice cream	1
Non-perishable	Milk, evaporated, whole, canned	26
	Milk, evaporated, 2%, canned	6
Priority Perishable	Cheese, processed, cheddar	1
	Cheese, mozzarella, cheddar, block	2
	Milk, fluid, 2%	49
	Milk, fluid, whole	29
	Yogurt	9
Total (all Dairy Products)		135

Note: Includes foods with an average consumption of 1 gram or more.

Store Meat, Poultry and Fish

According to the 24-hour recall, women consumed more than twice as much store Meat, Poultry and Fish as traditional food (111 grams versus 46 grams) (Table 12). Ground beef accounted for about one third, and frozen, breaded, fried chicken, 19%. The amount of store meat consumed was approximately 50% higher than in 1992.

Table 12. Mean daily amounts of store Meat, Poultry and Fish consumed by First Nation women: 24-hour recall, Fort Severn, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Beef, ground	37
	Turkey and chicken	12
	Wieners	9
	Other beef cuts	11
	Pork	6
	Ham	2
	Luncheon meats, sliced	2
	Bacon and sausages	4
Non-perishable	Luncheon meat, pork, canned	2
Convenience Perishable	Breaded fried chicken	21
Total (all store Meat, Poultry and Fish)		111

Note: Includes foods with an average consumption of more than 1 gram.

Eggs

Women on average consumed 38 grams of eggs per day, or about five eggs per week.

Cereal Products

This group includes all pasta, except pasta and cheese dinners (e.g., Kraft Dinner), which are included with Miscellaneous foods. The most important cereal products were pasta, white bread and rolls and instant rice (Table 13). An average of 11 grams of whole grain bread was reported. Cooked breakfast cereals were more important than ready-to-eat varieties. The total amount of Cereal Products was about 30% lower than in 1992. Whole grain breads were more popular than in 1992.

Table 13. Mean daily amounts of Cereal Products consumed by First Nation women: 24-hour recall, Fort Severn, 2002

Food Mail category	Food	Amount (grams)
Priority Perishable	Bread, whole wheat	11
	Cook-type cereals, cooked	12
Nutritious Perishable	Bread and rolls, white	26
Non-perishable	Rice, all types, cooked	26
	Pasta, cooked	32
	Flour	6
	Crackers	3
	Cake and pancake mix	7
	Ready-to-eat breakfast cereals	4
Total (all Cereal Products)		131

Note: Includes foods with an average consumption of more than 1 gram.

Fruits and Vegetables

Fruits and vegetables are known to have a protective effect against cardiovascular disease and to reduce blood pressure [47 48 49 50]. An average of 175 grams of fruit and vegetables was reported, including apple juice, orange juice, fresh oranges and fresh potatoes (Table 14). Half of the total amount of fruit and vegetables was juice. The total amount was lower than in 1992 (211 grams). However, most of the decline was due to a lower consumption of frozen French fries.

This amount corresponds to about one and a half servings, much less than the recommendation of five to ten servings a day by Health Canada or the World Health Organization (WHO) recommendation of 400 to 500 grams (excluding potatoes) [51].

Table 14. Mean daily amounts of Fruits and Vegetables consumed by First Nation women: 24-hour recall, Fort Severn, 2002

Food group	Food Mail category	Food	Amount (grams)
Citrus and Tomatoes	Nutritious Perishable	Orange juice, chilled	4
	Non-perishable	Orange juice canned or tetra pak	13
		Tomato paste	1
		Tomato and pasta sauce, canned	3
		Tomatoes, canned	5
		Citrus fruit, canned	1
		Apple juice, canned or bottled, vitamin C	41
	Priority Perishable	Apple juice, frozen, reconstituted	19
		Oranges and tangerines	11
		Orange juice, frozen, reconstituted	9
		Tomatoes, fresh	1
Other Fruit	Non-perishable	Canned fruit	4
	Priority Perishable	Apples	2
		Bananas	5
		Grapes	1
		Melon	3
Potatoes	Nutritious Perishable	Potato, French-fried and hash brown, frozen	4
	Non-perishable	Potatoes, instant mashed	2
	Priority Perishable	Potatoes, fresh	19
	Convenience Perishable	Breaded potato patties, frozen	1
Other Vegetables	Non-perishable	Corn niblets, canned	5
		Corn, creamed, canned	1
		Mixed vegetables, canned	1
		Mushrooms, canned	1
	Priority Perishable	Mixed vegetables, frozen	7
		Onions	4
		Salad mix, packaged	2
		Carrots, fresh	1
Total (all Fruits and Vegetables)			175

Note: Includes foods with an average consumption of 1 gram or more.

Fats and Oils

According to the 24-hour recall, First Nation women consumed an average of 8 grams of fats and oils. The most commonly consumed fats were hydrogenated soft margarine, butter and non-hydrogenated margarine.

Sugar and Sweets

The average consumption of Non-perishable Sugar and Sweets (excluding Foods of Little Nutritional Value) was 164 grams, compared to 40 grams in 1992. Reconstituted fruit drink crystals with vitamin C were the most important food in this group, with an average daily consumption of 112 grams (including added water), followed by fruit drinks with vitamin C (16 grams), low-calorie fruit drink crystals, including added water, (21 grams) and sugar, at 12 grams.

Miscellaneous Foods

This group includes Nutritious Perishable foods such as pizza, Non-perishable foods such as tea, coffee, baking powder, macaroni and cheese dinner, canned beef stew, canned pasta dishes, canned soup and soup mix, and Convenience Perishables such as packaged sandwiches and burgers. Water, including the water used in coffee, tea and soup, is also included in this group. An average of 943 grams of Miscellaneous foods were reported. The most important, by weight, were tea, water, and coffee (Table 15).

Foods of Little Nutritional Value

An average of only 179 grams of Foods of Little Nutritional Value were consumed per day (Table 16), compared to 308 grams in 1992 [2]. This difference is primarily due to the substitution of fruit drink crystals with vitamin C, which are classified as Non-perishable sweets, for fruit drink crystals without vitamin C, considered Foods of Little Nutritional Value. The most important foods in this category were regular soft drinks, aspartame-sweetened soft drinks, and fruit drink crystals without vitamin C.

Table 15. Mean daily amounts of Miscellaneous Foods consumed by First Nation women: 24-hour recall, Fort Severn, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Frozen pizza	26
	Frozen dinners	2
	Water, bottled	7
Non-perishable	Coffee, brewed	129
	Tea, brewed	444
	Water, municipal	187
	Macaroni and cheese dinner, prepared	19
	Soup mix, prepared	25
	Soup, canned, prepared	27
	Mixed dishes, beef stew, canned	17
	Frozen rice or pasta dishes	14
	Corned beef hash, canned	4
	Tea, instant, presweetened	3
	Canned pasta	3
Convenience Perishables	Packaged sandwiches and burgers	22
Total (all Miscellaneous foods)		943

Note: Includes foods with an average consumption of more than 1 gram.

Table 16. Mean daily amounts of Foods of Little Nutritional Value consumed by First Nation women: 24-hour recall, Fort Severn, 2002

Food	Amount (grams)
Cookies, cakes, pies, prepared, packaged	9
Potato chips	16
Fruit drink crystals, no vitamin C, with water	32
Soft drinks, regular	76
Soft drinks, with aspartame	47
Total (all Foods of Little Nutritional Value)	179

Note: Includes all foods with an average consumption of 1 gram or more.

Food Preparation Methods

Hydrogenated soft margarine and butter were the most common spreads used on bread or bannock. Fresh or boxed 2% milk was the milk most commonly used on cereal, while canned evaporated milk was the preferred liquid for mashed potatoes. Over half used water rather than milk for macaroni and cheese dinner and about 80% did not use milk in bannock. In tea and coffee, the majority used fresh or boxed milk. Fifty-seven percent of respondents did not make bannock. Among those who did, lard was the most common fat used. The average proportion of flour to lard (by weight) used to prepare baked bannock was 6.5 to 1. Oil was the most commonly used fat for frying bannock, meat or fish.

Health and Lifestyle of Women

Self-rated health status

Self-rated health status was not as positive as in 1992. Fifty-six percent of women rated their health as good or very good, 44% as fair or poor and none as excellent (Figure 14). In 1992, 65% rated their health as good to excellent and 35% as fair or poor [2]. By comparison, only 6.9% of Canadian women aged 15 to 44 years of age rated their health as fair or poor in 2000-2001 [52]. Eight women reported medical conditions that affected their diet, including diabetes (3), gallbladder disease (3), hypertension (1) and thyroid conditions (1).

Fair or poor self-rated health was significantly related to the degree of concern over alcohol and drug abuse ($p<0.05$) and food costs ($p<0.01$), but not to food security status. In households that were extremely concerned over food costs, 62% of women rated their health fair or poor.

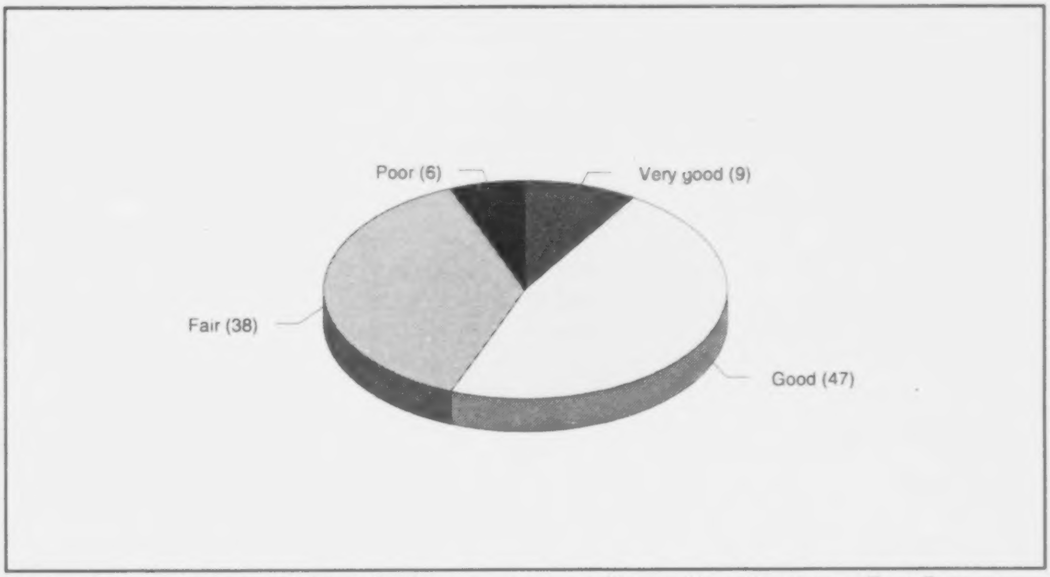

Figure 14 Percent of First Nation women by self-rated health status, Fort Severn, 2002

Smoking

Although 21 women (32%) had never smoked, smoking rates were higher than in the general Canadian population (Table 17). Fifty-six percent of all women smoked (Figure 15), reporting an average of 7 cigarettes per day, compared to 48% in 1992 [2]. Only one pregnant women smoked (2 cigarettes per day). On average, women started smoking at 14 years of age.

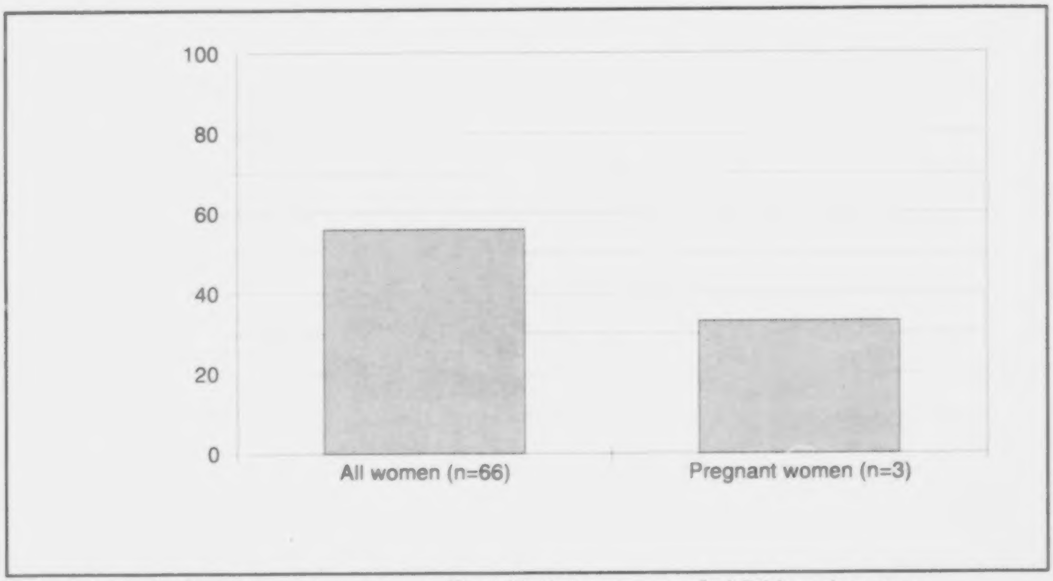

Figure 15 Smoking rates among First Nation women of child-bearing age, Fort Severn, 2002

Table 17. Smoking, First Nation women, Fort Severn, 2002

Smoking rate	%
All women (n=66)	56
Pregnant women (n=3)	33
Women who had never smoked	32
Women who had quit quite smoking	12
Average age women started smoking (n=45)	14
Frequency of smoking (n=36)	%
Every day	61
Occasionally	39
Total	100
Average number of cigarettes per day	
All women	7
Pregnant women	2

Weight-related health risks

The BMI includes both height and weight and is used to provide an estimate of body fat. It is an indicator of health problems associated with underweight, overweight and obesity.

Over the past two decades, obesity has been increasing among adults in Canada [53 54 55]. Globally, WHO considers obesity an epidemic, affecting high and low income countries alike [51 57]. Within Aboriginal communities, there is a higher prevalence of obesity than in the general Canadian population [1 2 3 4 5 8 56]. There is convincing evidence of a relationship between BMI and the risk of illness and death, especially the risk of cardiovascular disease (CVD), type 2 diabetes, gestational diabetes and hypertension [51 57]. Type 2 diabetes is more prevalent among First Nation women than in the general Canadian population [58]. Among Western James Bay Cree women, the rate of type 2 diabetes ranges from 7.9 per 1000 among women 15 to 24, to 43.8 among women aged 25-34, and a rate of 120.2 per 1000 among women 35 to 44 [59]. Gestational diabetes is also more prevalent among First Nation women than in the general population [60]. Research has also confirmed a higher prevalence of gestational diabetes among obese First Nation women and a greater risk of gestational diabetes among overweight First Nation women than among overweight non-Aboriginal women [61 62].

According to the Canadian Guidelines for Body Weight Classification in Adults, the classification system established for Canadians in general applies to First Nation populations [57]. However, it is important to note that little research has been done to establish the health risks associated with body weight and body fat distribution among Aboriginal people and some racial or ethnic groups may be more susceptible to health problems associated with obesity than others.

Weights and heights were available for only 36 non-pregnant First Nation women in Fort Severn. Every effort was made to convince the participants to have their weight and height measurements recorded at the clinic. However, due to a general reluctance among participants to be weighed, we were only able to do clinic measurements for nine women. Many of the women were familiar with their weight. While a number of studies have found a high correlation between self-reported weights and heights and clinical measures, they have also found that self-reported weights tend to result in an underestimate of the prevalence of overweight and obesity [63 64 65 66 67]. This research suggests that the actual BMI could be higher than self-reported for 30% of overweight or obese subjects, although no research is available for First Nation women. Also, it is important to recognize that the distribution of weights and heights of those who refused to provide these measurements by one method or the other may differ from the distribution of reported measurements.

Only 17% of non-pregnant First Nation women in Fort Severn had a BMI between 18.5 and 24.9, which is considered the healthy range (Figure 16). Eighty percent had a BMI of 25 or more, a level considered to increase the risk of certain chronic diseases, including heart disease, hypertension, type 2 diabetes, insulin resistance, osteoarthritis, some types of cancer and gallbladder disease, 25% had a BMI of 30.0 to 34.9 (high risk), 14% a BMI of 35.0 to 39.9 (very high risk) and 8% were at extremely high risk with a BMI over 40 [57]. BMI was higher among women aged 25 to 44 than among younger women ($p<0.05$). In this community, however, BMI was not associated with poor or fair self-rated health status.

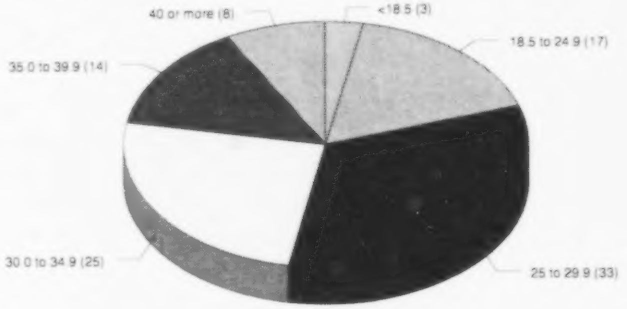

Figure 16 Percent of non-pregnant First Nation women by BMI category, Fort Severn, 2002

Waist circumference (WC) is now replacing the waist-hip ratio (WHR) as a an indicator of increased health risk associated with obesity [57]. The WC is considered by WHO to be a more practical measure of abdominal fat, which includes under-skin fat and visceral fat (fat around internal organs), is more closely related to health risk than the WHR and is recommended as an adjunct to the BMI for assessing health risks for those with a BMI in the 18.5 to 34.9 range [51 57]. A large amount of visceral fat is associated with insulin resistance, hyperinsulinemia, glucose intolerance and hyperlipidemia, all of which are risk factors for type 2 diabetes and CVD [51 57 68 69 70]. In women, a WC of 80 cm or more is associated with an increased risk for Type 2 diabetes and CVD. A WC of 88 cm or more is associated with a substantially increased risk of these diseases [71 72]. In this study, only 28 non-pregnant women with a BMI under 35 agreed to a waist circumference measurement. Twenty-one percent of these had a WC of 88 cm or more, placing them at substantially increased risk of obesity-related diseases.

Activity level

Regular physical exercise is extremely important in the prevention of chronic diseases such as CVD and type 2 diabetes [51]. The WHO recommends at least 60 minutes of moderate activity per day to prevent obesity and its complications, including CVD and type 2 diabetes [51]. In response to the question on general activity levels, 18% of First Nation women in Fort Severn were sedentary, 52% were engaged in light activity, 9% were moderately active and 21% very active. Two thirds of women did not spend any time on the land in the past year and 17% less than one month.

Energy and Macronutrient Intake

Energy

Estimating energy requirements is a complex task, since requirements are influenced by a number of factors, including age, sex and activity level. Energy requirements can be calculated using the BMI, height, age, sex and a coefficient for activity level. The questions used in this survey to assess physical activity were very general, and did not provide a precise description of activity patterns. More detailed questions are available, based on the number of minutes per day spent on different activities. However, these activities are ones commonly engaged in by southern Canadians and do not include common activities of the First Nation population (e.g., hunting, fishing, snowmobiling, picking berries, etc.). Energy requirements are believed to increase by 5% in cold climates, and there can be an additional energy cost (2 to 5%) due to the increased weight of clothing, especially in active individuals [73 74].

Since there were only nine lactating women and three pregnant women, adjusted means and medians for energy and macronutrient intake were only calculated for women who were not pregnant or lactating. Mean energy intake was 1455 Calories (Table 18). For all women, the unadjusted mean energy intake was 1438 Calories compared to 2094 in 1992. In previous INAC surveys among Aboriginal women, mean energy intake ranged from 1696 Calories to 3375 Calories [1]. Recent nutrition surveys in Prince Edward Island, Nova Scotia, Quebec, Ontario and Saskatchewan reported mean energy intakes ranging from 1721 to 1950 Calories for women aged 18 to 34, and 1571 to 1767 Calories for women aged 35 to 49 [75 76 77 78 79].

Table 18. Adjusted mean and median energy and macronutrient intake, First Nation women, 15 to 44, Fort Severn, 2002

	Not pregnant or lactating (n=53)	
	Mean	**Median**
Calories	1455	1405
Protein (g)	71	69
Carbohydrate (g)	169	161
Fat (g)	55	54
Saturated Fatty Acids (g)	18.5	18.2
Polyunsaturated Fatty Acids (g)	9.1	8.5
Cholesterol (mg)	328	318
Total sugars (g)	59	41
Dietary fibre (g)	8	7.5
Alcohol (g)	0	0
Caffeine (mg)	180	159
Energy distribution	%	
Protein	20	
Carbohydrate	46	
Fat	34	
Saturafed fat	11.4	

The mean and median energy intake appears to be unusually low compared to that reported in other studies for women of a similar age, particularly in view of the high prevalence of obesity in this population. The estimated energy requirement for women of this age and height to maintain the mean BMI would range from approximately 2148 to 3039 Calories, depending on their activity level [80]. A number of studies have found more under-reporting among overweight women and that foods perceived as unhealthy, such as those included in the category of Foods of Little Nutritional Value, are the ones most likely to be under-reported. While there is the possibility of some unintentional under-reporting, survey participants and interviewers contacted in the community discussions did not feel this was the case. As they explained, there was a great deal of interest in the study among the participants. They thought that the community-wide weight loss program would have been a factor. Twenty-eight of the women were enrolled in the weight loss program at the time of the survey. They also suggested that food consumption would generally be lower during the period just prior to Christmas.

Given the low mean calorie intake, it is not surprising there was no relationship between energy intake and BMI in this study, although there was a trend toward lower calorie intake among women aged 25 to 44 compared to the younger age group ($p<0.01$).

Mean energy intakes from food groups are shown in Table 19. Meat, Poultry and Fish provided 26% of energy, only 21% of which came from traditional food. Frozen breaded fried chicken accounted for 15% of the energy contribution of this group. Miscellaneous foods and Cereal Products provided 18% and 17% of calories, respectively. Unlike 1992, when 21% of energy came from Foods of Little Nutritional Value, these foods were not an important source of energy (7%) during this survey. Only 11% of energy came from foods classified as Sugar and Sweets.

Protein, fat and carbohydrate

The adjusted mean intake of protein, fat and carbohydrate for women not pregnant or lactating was 71, 55 and 169 grams, respectively. Mean saturated fat intake was 18.5 grams. For all women, the unadjusted mean intakes of protein (71 grams), fat (56 grams) and carbohydrate (164 grams) were lower than in 1992 (114, 78 and 233 grams, respectively) [1]. Median intake of cholesterol was 318 mg. Median intake of trans fatty acids was 0.5 grams. However, since the CNF database is incomplete for trans fatty acids, especially data for deep-fried food, baked goods and hydrogenated soft margarine, actual intake would be higher than this.

Protein and carbohydrate accounted for 20% and 46% of energy, respectively, for women not pregnant or lactating (Figure 17). The percentage of energy derived from carbohydrate was within nutrition guidelines (45 to 65%). Fat provided 34% of energy, which is also within current nutrition guidelines (20 to 35% of energy). Saturated fat provided 11.4% of energy intake, higher than the generally recommended limit (8 to 10% of calories). For all women, the mean intake of saturated fat was 19.3 grams (12.1% of energy), compared to 28.2 g in 1992 (also 12.1% of energy) [1].

Table 19. Mean energy intake (Calories per day) from food groups and Food Mail categories, First Nation women, Fort Severn, 2002

Food group	Food Mail category	Mean	%
Dairy Products	Priority Perishable	61	4.2
	Nutritious Perishable	13	0.9
	Non-perishable	40	2.8
Eggs	Priority Perishable	55	3.8
Meat, Poultry, Fish	Nutritious Perishable	230	16.0
	Non-perishable	6	0.5
	Traditional	80	5.6
	Convenience Perishable	58	4.0
Alternates	Non-perishable	11	0.7
Cereal Products	Priority Perishable	31	2.2
	Nutritious Perishable	76	5.3
	Non-perishable	139	9.7
Fruits, Vegetables	Priority Perishable	52	3.6
	Nutritious Perishable	11	0.8
	Non-perishable	46	3.2
	Convenience Perishable	1	0.1
Fats, Oils	Nutritious Perishable	48	3.3
	Non-perishable	14	1.0
Sugar, Sweets	Non-perishable	103	7.2
Miscellaneous	Nutritious Perishable	70	4.9
	Non-perishable	117	8.2
	Convenience Perishable	69	4.8
Foods of Little Nutritional Value		106	7.4
Cereal Products		36	2.5
Potato chips		9	0.6
Sweets		55	3.8
Miscellaneous		6	0.5
Total		1438	100.0

Note: Percentages are based on unrounded figures.

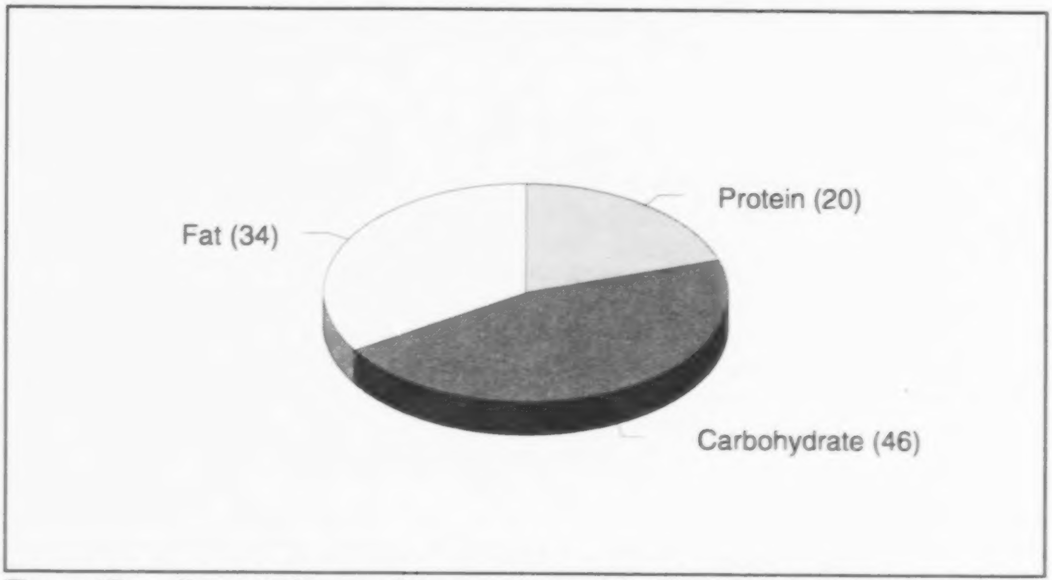

Figure 17 Percent of energy from protein, carbohydrate and fat, First Nation women (not pregnant or lactating), Fort Severn, 2002

Concern over the intakes of fat, saturated fat and trans fat is based on the prevalence of certain chronic diseases, such as CVD, type 2 diabetes, and cancer in Canada and the United States. Obesity, especially abdominal obesity, is a major risk factor for CVD and type 2 diabetes. An alarming increase in obesity in both countries has led to an investigation into the distributions of fat and carbohydrate among high-risk populations that predispose to the development of overweight and obesity and distributions that are likely to worsen the metabolic consequences of obesity among populations that are already overweight or obese. A number of studies have found an association between diets unusually low or high in fat or carbohydrate (as a percent of energy) with CVD and type 2 diabetes. In animal studies, a high-fat (mostly saturated), refined-carbohydrate (sucrose) diet tends to favour obesity and an increase in plasma total cholesterol, low-density-lipoprotein (LDL) cholesterol and triglycerides, while a low-fat, complex carbohydrate diet does the reverse [81]. However, epidemiological and interventional studies provide mixed results on the question of whether high fat (low carbohydrate) diets lead to overweight and obesity or promote weight gain. Short-term studies suggest that high fat intakes, without adjustment in activity level, may, over the long term, promote weight gain, especially among populations predisposed to obesity. However, excess energy intake rather than fat intake per se is the culprit. Lower fat diets (low percentage of fat) are accompanied by reduced energy intake and are therefore associated with moderate weight loss or prevention of weight gain [82 83 84 85].

Studies examining the relationship between fat intake and CVD across populations whose diets vary widely in total fat clearly demonstrate that the quality of fat is more closely associated with CVD than the quantity per se [86 87]. High intakes of saturated fat and trans fatty acids are associated with elevated blood LDL cholesterol concentrations and, therefore, a higher risk of CVD. According to WHO, there is a probable causal link between a high saturated fat intake and type 2 diabetes, as well as one between a high fat intake and type 2 diabetes, and therefore they recommend that saturated fat intake not exceed 10% of energy [51]. For high risk groups (e.g., people who are overweight, have a family history of diabetes, elevated LDL blood cholesterol and triglycerides, and a waist circumference above 88 cm), WHO recommends that saturated fat intake not exceed 7% of calories [51]. Trans fatty acid intake is also positively associated with total blood cholesterol and LDL cholesterol, and therefore with a higher risk of CVD [80]. Some investigators have also reported an association between trans fatty acids and the risk of Type 2 diabetes [88].

The Acceptable Macronutrient Distribution Range for fat (20 to 35%) is based on evidence indicating a higher risk for CVD with low intakes of fat and high intakes of carbohydrate and the evidence for increased risk of obesity and obesity-related diseases with high fat intakes among high-risk populations [80]. Traditional First Nation diets were very high in protein, and although they may have been just as high in fat as current levels, it is believed that the traditional high-protein and low-carbohydrate intake would favour low levels of LDL cholesterol. The traditional diet would also have contained a higher percentage of omega-3 fatty acids, and less saturated fat than is the case today. There is growing evidence that omega-3 fats may provide some protection against CVD. The traditional lifestyle, which relied heavily on game, birds and fish to provide an abundant supply of antioxidants such as vitamin A, vitamin E and selenium, together with a more active lifestyle, less stress, less smoking, and a lower salt intake, may have acted together to protect against heart disease and diabetes [89].

Sources of fat and saturated fat

The major food sources of fat, in descending order of importance, were store meats (34%), primarily ground beef, miscellaneous foods such as pizza, canned beef stew and packaged sandwiches and burgers (19%) and dairy products (10%) (Table 20). Traditional food supplied only 5% of fat compared to 29% in 1992 [1]. Saturated fat came mainly from store meat (35%), dairy products (17%), and miscellaneous foods like canned stews, packaged sandwiches and burgers and pizza (18%).

Table 20. Mean fat and saturated fat intake (grams per day) from major sources, First Nation women, Fort Severn, 2002

Food group	**Food Mail category**	**Fat**		**Saturated fat**	
		Mean	**%**	**Mean**	**%**
Dairy Products	Priority Perishable	3	5	1.7	9
	Nutritious Perishable	1	1	0.3	2
	Non-perishable	2	4	1.3	7
Eggs	Priority Perishable	4	7	1.1	6
Meat, Poultry, Fish	Nutritious Perishable	15	27	5.7	29
	Non-perishable	1	1	0.2	1
	Traditional	3	5	0.8	4
	Convenience Perishable	3	6	0.8	4
Fruits, Vegetables	Priority Perishable	0.4	1	0.1	0.4
	Nutritious Perishable	0.4	1	0.1	0.5
Fats, Oils	Nutritious Perishable	5	9	1.7	9
	Non-perishable	2	3	0.4	2
Miscellaneous	Nutritious Perishable	3	6	1.1	6
	Non-perishable	4	7	1.3	7
	Convenience Perishable	4	7	1.2	6
Foods of Little Nutritional Value		3	5	0.8	4
Total (all sources)		56	100	19.3	100

Note: Percentages are based on unrounded figures.

Fibre

As in 1992, median dietary fibre intake was only about one third of that recommended for good health [90]. This is not surprising, given the low consumption of whole grains and fruits and vegetables.

A recent study on the effect of diet on CVD by Children's Hospital Boston followed 2909 adolescents over a ten-year period. They found that fibre consumption was a stronger predictor of insulin levels, weight gain and other cardiovascular risk factors than total fat or saturated fat consumption. They concluded that high-fibre diets may protect against obesity and CVD by lowering insulin levels [91]. After reviewing the evidence of the protective effect of fibre against CVD, the DRI Committee concluded that the data are strong enough to make a recommendation for fibre intake and to support the claim that an increased fibre intake appears to benefit both men and women in this respect. The data suggest that an intake of 14 grams per 1000 Calories per day, particularly from cereals, will promote heart health [80]. The WHO further states that a high dietary fibre intake helps to prevent obesity and promote weight loss and recommends a daily intake of 20 grams [51].

Caffeine

Mean caffeine intake was only 180 mg (well within Canadian health guidelines for adults and less than the maximum levels of 300 mg per day recommended for women who are planning to become pregnant) [92].

Vitamins

Adjusted mean and median vitamin intakes and the percentage of women with intakes below the EAR are presented in Table 21. Data were not analysed for pregnant or lactating women due to the small sample size. Since the mean age was 30 for women who were not pregnant or lactating, we used the EARs for women 19 to 30.

Vitamin A

Among women who were not pregnant or lactating, mean and median intakes of vitamin A were 351 RE and 334 RE, respectively. For all women, the unadjusted mean intake (383 RE) was lower than that reported in 1992 (601 RE) [1].

The EAR for vitamin A is now expressed in Retinol Activity Equivalents rather than Retinol Equivalents. This new measure reflects changes to the conversion factors for carotenoids based on the most recent research [93]. Unfortunately, nutrient data for the Retinol Activity Equivalent of foods are not yet available, so that it was not possible to assess the probability of inadequacy of vitamin A. However, using earlier methods of assessing adequacy, less than adequate vitamin A intakes have also been reported among the Oji-Cree women of northern Ontario [3], Cree women in northern Manitoba [8], the Ojibway women of southern Ontario [5] and Navaho women of Arizona [9].

Table 21. Adjusted mean and median vitamin intake of First Nation women, 15 to 44, and percent with inadequate intake, Fort Severn, 2002

		Not pregnant or lactating (n=53)			
		Mean	**Median**	**EAR**	**% <EAR**
Vitamin A	RE	351	334		
Vitamin C (Smokers)*	mg	105	54	95	67
Vitamin C (Non-smokers)*	mg	105	54	60	53
Thiamin	mg	1.19	1.16	0.9	24
Riboflavin	mg	1.57	1.5	0.9	8
Niacin	NE	31	30	11	1
Vitamin B6	mg	0.98	0.95	1.1	68
Dietary Folate Equivalents	µg	306	285	320	62
Vitamin B12	µg	5.2	4.5	2	9

Note: The EAR represents the average daily nutrient intake level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group. The proportion with an intake below the EAR is considered to have a usual inadequate intake.

* Due to the small sample size and since over half of women smoked, the mean and median vitamin C intake was calculated for the whole group of non-pregnant, non-lactating women.

Vitamin A is important for normal vision, gene expression and embryonic development and normal immune function. An inadequate intake may result in night blindness, embryonic lung defects, impaired T-cell function and a higher risk of respiratory infections and diarrhea. Vitamin A also interacts with other nutrients, including iron. A number of studies suggest that vitamin A deficiency impairs haemoglobin formation and therefore vitamin A supplementation in combination with iron may be more effective than iron alone in the treatment of anaemia [94].

Preformed vitamin A is obtained from animal foods. It can also be manufactured in the body from provitamin A carotenoids found in dark green or orange fruits and vegetables. The most important traditional First Nation sources of vitamin A (retinol) are caribou and moose liver – foods that were not reported on the 24-hour recall. Store foods rich in vitamin A include beef or pork liver, carrots, squash, frozen mixed vegetables, tomato sauce, cheddar cheese, eggs and margarine.

In this survey, the major sources of vitamin A were eggs, fluid milk, margarine, frozen mixed vegetables, carrots, evaporated milk and pizza (Table 22). It is possible that vitamin A intake would be higher in other seasons when traditional sources of vitamin A are more available.

Table 22. Mean vitamin A intake (RE per day) from major sources, First Nation women, Fort Severn, 2002

Food Mail category/food group	RE	%
Priority Perishables		
Dairy Products	47	12
Eggs	60	16
Vegetables	62	16
Nutritious Perishables		
Dairy Products	5	1
Fats and Oils	47	12
Miscellaneous	19	5
Non-perishable		
Dairy Products	18	5
Miscellaneous	56	15
Convenience Perishable		
Meat, Poultry, Fish	4	1
Miscellaneous	13	3
Total (all sources)	383	100

Note: Percentages are based on unrounded figures.

Vitamin B_6

Sixty-eight percent of non-pregnant, non-lactating women had an inadequate intake of vitamin B_6 (Figure 18, Table 21). By comparison, the Continuing Survey of Food Intake of Individuals in the United States (CSFII 1994-1996) found 15% of non-pregnant, non-lactating women aged 19 to 50 had less than the EAR for vitamin B_6 [26]. In 1992, mean vitamin B_6 intake in Fort Severn was 2.57 mg, 60% of which came from traditional food, compared to 1.00 mg for all women in 2002 [1].

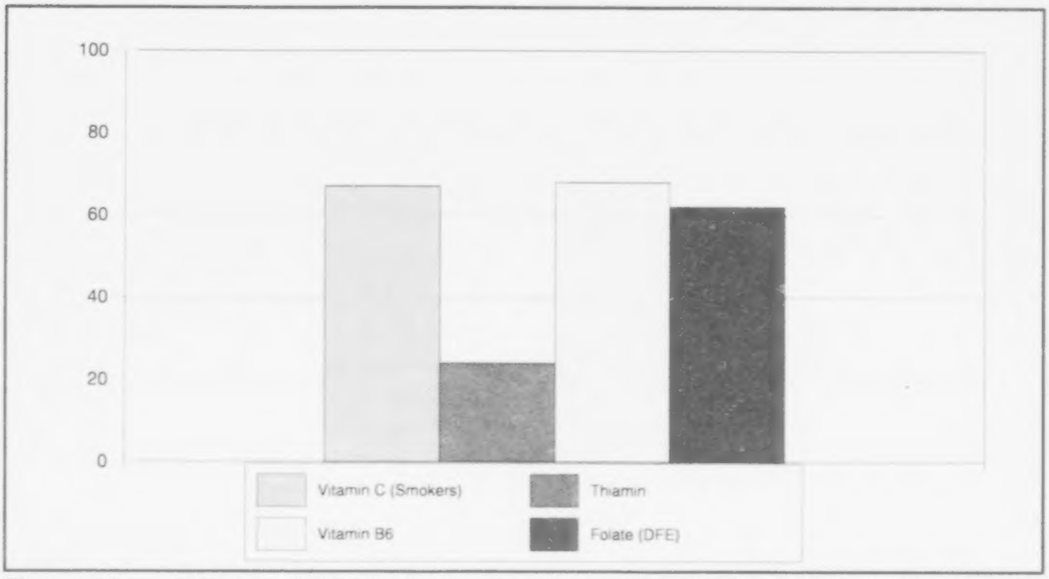

Figure 18 Percent of First Nation women (not pregnant or lactating) with inadequate vitamin intakes, Fort Severn, 2002

Classic symptoms of vitamin B_6 deficiency include dermatitis, microcytic anaemia, depression and confusion. Low intakes of vitamin B_6 during pregnancy may lead to poor vitamin B_6 status in the infant, resulting in convulsions. The EAR for vitamin B_6 is derived by using biochemical indicator cutoffs that have not been linked to clinical or physiological insufficiency. Clinical symptoms of deficiency have only been observed in controlled studies with very low levels of vitamin B_6, and have never been documented among non-pregnant women at intakes above 0.5 mg. Depletion-repletion studies of healthy women, to determine the intake required to return plasma values to their original state, suggest the average requirement of pyridoxine (an indicator of vitamin B_6 status) is less than 1.0 mg per day. However, in order to compensate for the bioavailability of vitamin B_6 in food, the EAR for women 19 to 30 is set at 1.1 mg of vitamin B_6 per day. Vitamin B_6 requirements may possibly be higher for individuals on very-high-protein diets [95].

In the traditional diet, organ meats, dried fish and game and wild birds are the best sources of vitamin B_6. Among store foods, beef liver, meat, bananas and highly fortified cereals are good sources. The major sources of vitamin B_6 in Fort Severn were store meat, fruits and vegetables and traditional food (mainly caribou) (Table 23).

Table 23. Mean intake of vitamin B_6 (mg per day) from major sources, First Nation women, Fort Severn, 2002

Food group	Food Mail category	mg	%
Dairy Products	Priority Perishable	0.04	4.0
	Nutritious Perishable	0.01	0.5
	Non-perishable	0.02	1.7
Eggs	Priority Perishable	0.03	3.4
Meat, Poultry, Fish	Nutritious Perishable	0.26	26.1
	Non-perishable	0.00	0.4
	Convenience Perishable	0.06	5.6
	Traditional food	0.16	15.6
Fruit, Vegetables	Priority Perishable	0.12	12.0
	Nutritious Perishable (French fries)	0.01	1.3
	Non-perishable	0.06	5.6
Cereal Products	Priority Perishable	0.02	2.0
	Nutritious Perishable	0.02	1.6
	Non-perishable	0.05	5.5
Miscellaneous	Nutritious Perishable	0.02	2.3
	Non-perishable	0.05	5.2
	Convenience Perishable	0.04	3.9
Foods of Little Nutritional Value		0.02	2.2
Total (all sources)		1.00	100.0

Note: Percentages are based on unrounded figures.

Folate

The DRI Committee examining the requirements for folate recognized that limitations in the traditional analytic methods used to estimate the folate content of foods result in an underestimate of folate in most nutrient databases. Therefore, current folate data may result in an overestimate of the percentage of the population below the EAR [95]. The EAR for folate is expressed as micrograms of Dietary Folate Equivalents (DFEs). This measure acknowledges the greater bioavailability of folic acid added to foods compared to naturally occurring food folate (1 μg DFE = 1 mcg of food folate and 1 μg DFE = 0.6

µg of folic acid added to foods). In this study, means and medians have been expressed in DFEs. Folic acid fortification of flour and pasta is now mandatory in Canada. The folic acid values in the CNF have now been reduced from original estimates based on the assumption that food manufacturers would add the maximum amount of folic acid allowed under the regulations to an estimate using an average amount, the approach used by the USDA.

Sixty-two percent of non-pregnant, non-lactating women in Fort Severn had inadequate folate intakes (Figure 18, Table 21). A low folate intake (320 µg or less per day) has been associated with elevated plasma homocysteine levels (greater than 14 µmol/L) which are associated with an increased risk for CVD [96]. When folate supply to the bone marrow becomes restricted enough to interfere with the formation of red blood cells, macrocytic anaemia may develop. When folate intake is inadequate to support the rapid development of new cells in the fetus (especially those of the brain and nervous system) during the first few weeks of pregnancy, this may result in neural tube defects, including spina bifida, in the newborn [95]. Population-based, case control studies of 468 cases with spontaneous abortion and 921 controls found that women with low plasma folate levels were at increased risk of spontaneous abortion [97]. Women who smoke may also be at greater risk for folate deficiency and spontaneous miscarriage, especially if they carry the mutant gene, methylyenetetrahydrofolate reductase 677IT, which is involved in the metabolism of folate [98]. This would suggest that women who smoke would benefit from higher doses of folic acid prior to conception.

Traditional sources of folate include liver and other organ meats, seaweed, berries and wild plants. Store foods rich in folate include orange juice, sunflower seeds, fortified flour, dark green vegetables, peas and beans.

Cereal Products (mainly pasta and white bread and rolls) were clearly the most important sources of folate (40%) (Table 24). Miscellaneous foods (mainly macaroni and cheese dinner, canned stew and pasta, tea, packaged sandwiches and burgers and pizza) contributed 27%. Fruits and vegetables and eggs provided 8% and 7%, respectively. In the southern Canadian diet, fruit, fruit juice and vegetables are also rich sources of folate. However, these foods have been less accessible in the northern diet.

Table 24. Mean Dietary Folate Equivalent intake (µg per day) from major sources, First Nation women, Fort Severn, 2002

Food group	Food Mail category	µg	%
Dairy Products	Priority Perishable	5.3	1.8
	Nutritious Perishable	0.7	0.2
	Non-perishable	2.5	0.8
Eggs	Priority Perishable	21.0	7.1
Fruit, Vegetables	Priority Perishable	14.6	4.9
	Nutritious Perishable (French fries)	1.1	0.4
	Non-perishable	7.6	2.6
Cereal Products	Priority Perishable	5.3	1.8
	Nutritious Perishable	35.2	11.8
	Non-perishable	79.4	26.6
Miscellaneous	Nutritious Perishable	13.2	4.4
	Non-perishable	52.6	17.7
	Convenience Perishable	14.6	4.9
Foods of Little Nutritional Value		14.4	4.8
Total (all sources)		298	100.0

Note: Percentages are based on unrounded figures.

Vitamin C

Smoking depletes vitamin C stores in the body, increasing the EAR by 58%. In this study, we present the EAR for smokers and non-smokers, but since the majority of women were smokers, the EAR for smokers is more appropriate. Using this standard, approximately 67% of non-pregnant, non-lactating women had an inadequate intake of vitamin C [99] (Figures 18, Table 21). However, the unadjusted mean vitamin C intake for all women (101 mg) was higher than in 1992 (79 mg) [1].

It is important to note that the EAR for vitamin C is considerably higher than that required to prevent vitamin C deficiency, so that the percentage below the EAR does not mean these women were at risk of deficiency. Severe vitamin C deficiency leads to scurvy, a condition caused by a breakdown of connective tissue, characterized by inflamed and bleeding gums and impaired wound healing. Individuals made vitamin C deficient, but not scorbutic, showed signs of inflamed gums and fatigue [100, 101].

Traditional dietary sources of vitamin C would include berries and wild plants. The richest sources of vitamin C among store foods include oranges, orange juice, apple juice with added vitamin C, peppers and cabbage. In Fort Severn, fruits and vegetables provided 47% of vitamin C, with most of the remainder coming from fruit drink crystals with added vitamin C.

Niacin, thiamin, riboflavin and vitamin B_{12}

Among women who were not pregnant or lactating, there was very little or no risk of an inadequate intake of niacin (Table 21). However, 24% had an inadequate intake of thiamin (Table 21, Figure 18).

Thiamin is essential for carbohydrate and protein metabolism. The early signs of deficiency include anorexia, weight loss, mental changes such as apathy, decrease in short-term memory, confusion, irritability, muscle weakness and cardiovascular changes such as enlarged heart [95].

Cooked caribou and dried caribou or moose would be rich sources of thiamin. The major store food sources are fortified or enriched or whole grain products such as bread, grains and ready-to-eat cereals. Ham and pork are also rich sources of thiamin. In Fort Severn, thiamin came mainly from non-perishable cereal products, store meats and poultry.

Riboflavin intake was adequate for most non-pregnant, non-lactating women (Table 21). Riboflavin is involved in a number of metabolic reactions and in energy production. Early signs of deficiency include sore throat, swelling of throat and a glossy tongue [95]. Again, wild game, fish and liver are excellent sources of riboflavin. The best store food sources are milk, bread and fortified cereals. Traditional food and non-perishable cereal products were the main sources of riboflavin.

Only 9% of women had an inadequate intake of vitamin B_{12} (Table 21). This vitamin is essential for normal blood formation and neurological function. A deficiency results in pernicious anaemia, with symptoms similar to folate deficiency anaemia. Neurological effects of vitamin B_{12} deficiency include numbness and tingling of extremities, especially in the lower limbs, dizziness, loss of concentration, memory loss, disorientation, dementia, visual disturbances, insomnia, impotency and impaired bowel and bladder control.

Vitamin B_{12} comes mainly from animal foods, especially red meats, shellfish like mussels, clams, oysters and organ meats, milk and yogurt, and fortified cereals. In Fort Severn, 45% of vitamin B_{12} came from traditional food and 32% from store meat.

Minerals

Adjusted means, medians and the percentage of women who had inadequate intakes of selected minerals are presented in Table 25.

Magnesium

Ninety-two percent of non-pregnant, non-lactating women had an inadequate intake of magnesium. Inadequate magnesium intake may cause a fall blood calcium level. Muscle spasms are a clinical feature of emerging magnesium deficiency. More severe deficiency can lead to disturbances in heart rate. Magnesium deficiency may also play a role in the development of osteoporosis [102]. Among traditional foods, the best sources of magnesium are meats, raw and cooked clams, kelp, berries and wild plants [21]. Store food sources include green leafy vegetables, whole grains and nuts, with lower amounts in meat, fish and poultry.

In Fort Severn, the major sources of magnesium, in descending order of importance, were ground beef, caribou, pasta, rice, breakfast cereals, milk, tea, coffee and canned fruit and vegetables (Table 26).

Table 25. Adjusted mean and median mineral intake of First Nation women, 15 to 44, and percent with inadequate intake, Fort Severn, 2002

		Not pregnant or lactating (n=53)			
		Mean	**Median**	**EAR/AI***	**% <EAR**
Calcium	mg	448	423	1000*	
Iron~	mg	12.2	11.5	8.1	23
Magnesium	mg	174	168	255	92
Phosphorus	mg	894	867	580	13
Zinc	mg	9.9	9.3	6.8	22
Copper	µg	812	752	700	43
Manganese	mg	2.65	2.53	1.8*	

Note: Means are adjusted by the C-SIDE software program.

The EAR represents the average daily nutrient intake level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group. The proportion with an intake below the EAR is considered to have a usual inadequate intake.

* Adequate Intakes (AI) are used where EARs are not available. Intakes below the AI cannot automatically be considered inadequate across the population or group.

~ The percentage with an inadequate intake of iron was calculated using probabilities of inadequate intakes for a mixed population of adult women using and not using oral contraceptives.

Calcium

For non-pregnant, non-lactating women, mean and median intakes of calcium were 448 mg and 423 mg. The unadjusted mean intake for all women was 508 mg, compared to 777 mg in 1992 (Table 25) [1]. Low calcium intakes have also been reported in a number of other studies of First Nation women [2 6 8]. At the present time, there is insufficient scientific evidence to set an EAR for calcium. Instead, based on studies of calcium retention and bone mineral content, the Dietary Reference Intake Committee and its Panel on Calcium and Related Nutrients established an Adequate Intake (AI). This intake is considered sufficient to maintain calcium needs, while recognizing that lower intakes may be adequate for many [102]. In this study, mean and median calcium intakes were less than half the AI. However, since the AI is not based on requirements, nothing can be said about the proportion of the population with inadequate intakes [102].

Table 26. Mean magnesium intake (mg per day) from major sources, First Nation women, Fort Severn, 2002

Food group/Food Mail category	mg	%
Dairy Products		
Priority Perishable	13.3	7.9
Nutritious Perishable	2.0	1.2
Non-perishable	7.7	4.5
Meat, Poultry, Fish		
Nutritious Perishable	18.2	10.8
Non-perishable	0.2	0.1
Convenience Perishable	4.4	2.6
Traditional food	12.3	7.3
Eggs	3.6	2.1
Cereal Products		
Priority Perishable	10.8	6.4
Nutritious Perishable	6.6	3.9
Non-perishable	14.9	8.9
Fruit and vegetables		
Priority Perishable	11.4	6.7
Nutritious Perishable	1.3	0.8
Non-perishable	7.6	4.5
Miscellaneous		
Nutritious Perishable	5.6	3.3
Non-perishable	32.1	19.0
Convenience Perishable	4.4	2.6
Foods of Little Nutritional Value	6.3	3.7
Total (all sources)	169	100.0

Note: Percentages are based on unrounded figures.

Inadequate calcium intake during the period of bone formation, combined with inadequate exercise, may lead to osteoporosis in later life. Previous studies among Aboriginal Canadians have documented intakes among women and adults below recommendations [1]. But since calcium requirements vary widely, and absorption is more efficient on a low intake, it is difficult to determine whether current intakes are sufficient. Kuhnlein and coworkers suggest that current nutrient data may underestimate calcium intake in the Baffin Inuit population, which could also be the case here [21]. A recent cross-sectional study of 10 Inuit children 5 to 17 years of age examined the effect of a calcium load on the serum calcium and urinary calcium excretion. The results demonstrated that the Inuit had a distribution of vitamin D receptor genotypes similar to that of some Asian populations and significantly different from the white population. This genotype is believed to represent an adaptation to a low-calcium diet, enabling a more efficient intestinal absorption of calcium. This genetic difference is believed to enable the Inuit to mineralize their bones and maintain calcium balance with a significantly lower calcium intake than is recommended for the standard American diet. The authors caution that dietary calcium intakes based on the DRIs may result in hypercalciuria and renal damage for this population [103]. However, it is important to recognize the limitations of such a small cross-sectional study, especially with children whose calcium requirements are known to fluctuate. More rigorous research involving longitudinal studies would be necessary to confirm these results and to determine if they also apply to First Nation populations.

Good traditional sources of calcium include fish skin and heads, wild greens and clams. Among store foods, the best sources are milk, cheese, yogurt and canned salmon and sardines (with the bones). In Fort Severn, calcium came mainly from fluid 2% milk and canned evaporated milk, pizza and bread and rolls (Table 27).

Iron, zinc and copper

Twenty-three percent of non-pregnant, non-lactating women had an inadequate intake of iron, 22% an inadequate intake of zinc and 43% an inadequate intake of copper (Table 25). For all women, the unadjusted mean intake of iron was 53% of that reported in 1992 [2].

Iron deficiency leads to impaired work performance, anaemia and adverse pregnancy outcomes [93]. The body has the ability to regulate the excretion of zinc when body stores are low, so zinc deficiency is rare except in cases of general malnutrition, alcoholism or other diseases which affect its absorption. Impaired growth and a depressed immune function are the most prominent features of mild zinc deficiency. Copper is involved as a cofactor in a number of enzymes that play an important role in immune and cardiac function, connective tissue generation and repair and in the prevention of iron-deficiency anaemia. Copper deficiency is rare, but symptoms of an inadequate intake include anaemia.

Table 27. Mean calcium intake (mg per day) from major sources, First Nation women, Fort Severn, 2002

Food group/Food Mail category	mg	%
Dairy Products		
Priority Perishable	130	25.5
Nutritious Perishable	14	2.8
Non-perishable	83	16.3
Cereal Products		
Priority Perishable	8	1.5
Nutritious Perishable	32	6.2
Non-perishable	21	4.1
Sweets		
Non-perishable	22	4.4
Miscellaneous		
Nutritious Perishable	40	7.9
Non-perishable	49	9.6
Convenience Perishable	20	3.9
Foods of Little Nutritional Value	17	3.3
Total (all sources)	508	100.0

Note: Percentages are based on unrounded figures.

The best traditional food sources of iron and zinc are red meats, particularly dried caribou and moose, wild duck and goose[21]. Iron and zinc are also found in certain seafood such as mussels and oysters, and whole grains. Major store food sources of copper include organ meats, seafood, nuts and seeds, wheat bran, whole grains, enriched rice and pasta, tomato products, soft drinks, tea and coffee.

Low iron, zinc and copper intakes among some women in Fort Severn may be due to seasonal differences in consumption of traditional food.

Energy and Nutrient Contribution by Food Mail Category

Traditional food

Traditional food was the most important source of vitamin B_{12} (45%) and an important source of iron (24%), riboflavin (20%) and zinc (19%) (Figure 19, Table 28). It was not an important source of fat, vitamin C, folate or calcium. Traditional food provided only 6% of energy, compared to 21% in 1992 [1]. It was consumed on only 31% of interview days. On those days, women had significantly higher intakes of protein ($p<0.05$), vitamin B_6 ($p<0.05$), vitamin B^{12} ($p<0.01$) and iron ($p<0.001$) than on days when only market food was consumed. This demonstrates the nutritional significance of traditional food and the negative effect of the shift toward a diet based primarily on store food.

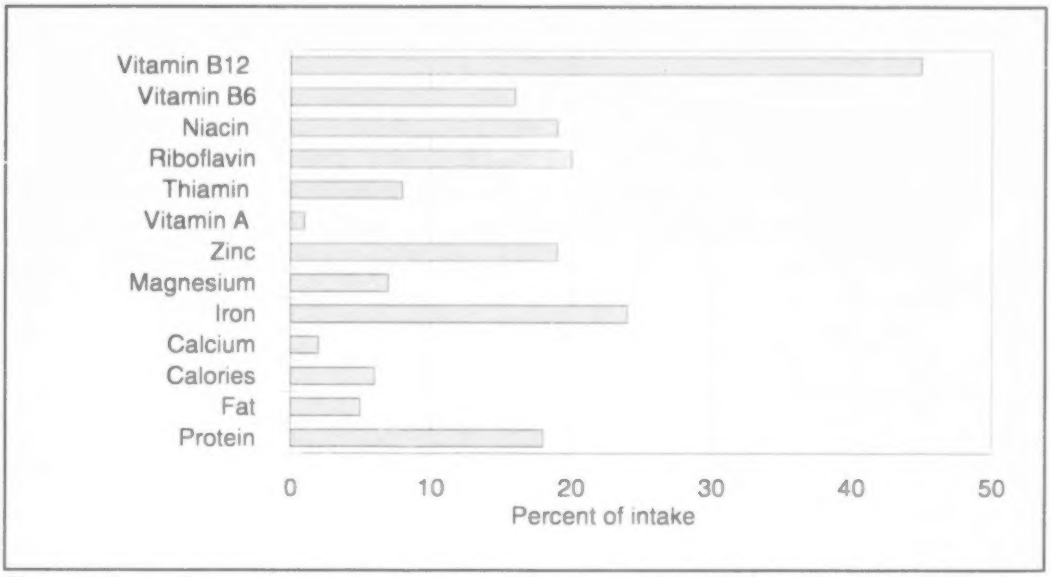

Figure 19 Percent energy and nutrients from traditional food, First Nation women, Fort Severn, 2002

Table 28. Mean daily amount of energy and selected nutrients obtained by Food Mail category, First Nation women, Fort Severn, 2002

	Traditional food	Priority Perishable food	Nutritious Perishable food	Non-perishable food	Convenience Perishable food	Foods of Little Nutritional Value	Total
Amount (g)	46	237	177	1253	49	179	1941
Protein (g)	13	11	28	12	7	1	71
Fat (g)	3	7	26	10	7	3	56
Carbohydrate (g)	0	23	25	87	9	20	164
Calories	80	198	448	477	128	106	1438
Caffeine (mg)	0	0	0	164	0	10	174
Total sugars (g)	0	5	1	35	3	9	53
Dietary fibre (g)	0.0	1.8	1.4	3.5	0.3	0.3	7.3
Calcium (mg)	9	168	100	189	26	17	508
Iron (mg)	2.8	1.2	3.1	3.5	0.7	0.3	11.5
Magnesium (mg)	12	39	34	68	9	6	169
Phosphorus (mg)	111	207	240	237	74	36	906
Potassium (mg)	138	416	403	675	108	45	1784
Sodium (mg)	29	186	656	1161	248	59	2339
Zinc (mg)	2.0	1.2	4.4	2.1	0.6	0.2	10.5
Copper (µg)	124	122	155	311	35	44	791
Manganese (mg)	0.0	0.4	0.2	1.6	0.0	0.1	2.4
Vitamin A (RE)	2	185	74	98	18	7	383
Vitamin C (mg)	1	21	3	75	1	1	101
Thiamin (mg)	0.10	0.15	0.38	0.41	0.08	0.02	1.14
Riboflavin (mg)	0.32	0.39	0.37	0.36	0.09	0.04	1.57
Niacin (NE)	5.5	3.4	11.6	5.4	2.5	0.4	28.7
Vitamin B6 (mg)	0.16	0.21	0.32	0.19	0.10	0.02	1.00
Dietary Folate Equivalents (µg)	2	46	69	145	21	14	298
Vitamin B12 (µg)	2.4	0.8	1.7	0.2	0.2	0.0	5.4
Cholesterol (mg)	45	153	78	23	26	1	327
Saturated Fatty Acids (g)	0.8	3.1	9.0	3.5	2.0	0.8	19.3
Polyunsaturated Fatty Acids (g)	0.4	0.9	3.1	1.7	1.6	0.7	8.4

Priority Perishable foods

The Priority Perishable category includes fresh milk (excluding chocolate milk), UHT milk, buttermilk, cheese, processed cheese, cottage cheese, yogurt, yogurt drinks, powdered milk, fresh vegetables, frozen vegetables (excluding French fries and similar potato products), fresh fruit, frozen fruit, frozen juice concentrate, eggs, cook-type cereals and whole wheat bread.

As Table 28 Illustrates, the consumption of these foods was low (a mean of 237 grams per day). Although they provided only 14% of calories, these nutrient-dense foods made an important contribution to the diet, providing 48% of vitamin A, one third of calcium, one quarter of fibre and riboflavin, 23% of potassium, phosphorus and magnesium, 21% of vitamin C and 47% of cholesterol (Figure 20).

T-tests did not reveal any statistically significant differences in the mean intake of folate or vitamin A from Priority Perishable foods by socio-economic status or adult food security status.

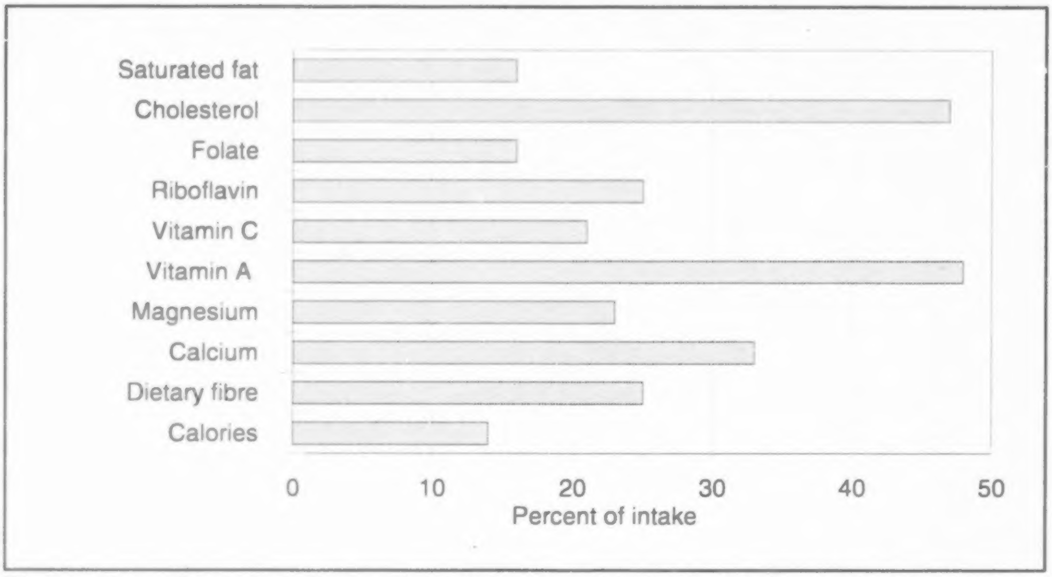

Figure 20 Percent energy and nutrients from Priority Perishable foods, First Nation women, Fort Severn, 2002

Nutritious Perishable foods

This category includes store Meat, Poultry and Fish, white bread and rolls, frozen French fries, margarine and butter and pizza. These foods (mainly meat, poultry and fish and margarine) were the most important source of fat (46%) and saturated fat (47%) (Table 28, Figure 21). Nutritious Perishable foods were also the principal source of zinc (42%), niacin (40%), and vitamin B_6 (32%), and supplied about one quarter of iron and cholesterol. They also contributed 31% of calories and 20% of calcium (pizza, white bread).

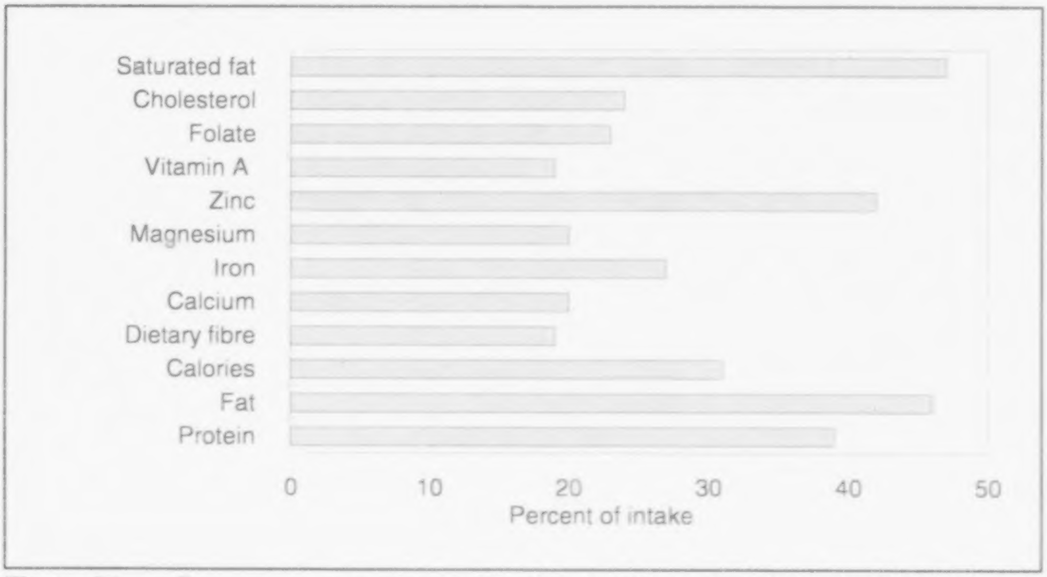

Figure 21 Percent energy and nutrients from Nutritious Perishable foods, First Nation women, Fort Severn, 2002

Non-perishable foods

Non-perishable foods (e.g., pasta, sugar, fruit drink crystals with vitamin C) provided 53% of carbohydrate and one third of calories (Table 28, Figure 22). They were the principal source of caffeine (94%), vitamin C (75%, mainly from fruit drink crystals with added vitamin C, fruit drinks and canned citrus fruit), and sugars. They were also the major source of folate (49%), mainly from pasta, and of sodium (50%), mostly from table salt, packaged pasta dinners and soup mixes.

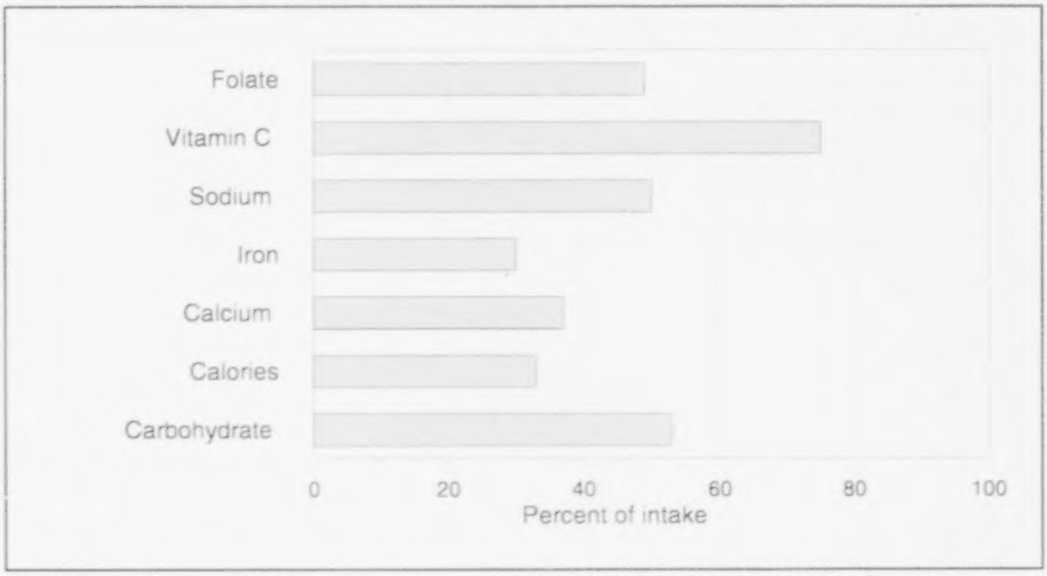

Figure 22 Percent energy and nutrients from Non–perishable foods, First Nation women, Fort Severn, 2002

Convenience Perishables

This category includes frozen breaded fried chicken and other products that are breaded, battered or in pastry, as well as packaged sandwiches and burgers. These foods provided 13% of fat, 10% of saturated fat and 9% of calories (Table 28).

Foods of Little Nutritional Value

This category includes soft drinks, candies, chocolate bars, potato chips, fruit drink crystals without vitamin C, cookies and coffee whitener. In this report, packaged sandwiches and burgers, which were previously considered as part of this category, are considered Convenience Perishables.

Unlike the survey in Fort Severn in 1992 and other nutrition surveys of Aboriginal women, Foods of Little Nutritional Value were not an important source of energy, fat, carbohydrate or sugar (Table 28, Figure 23).

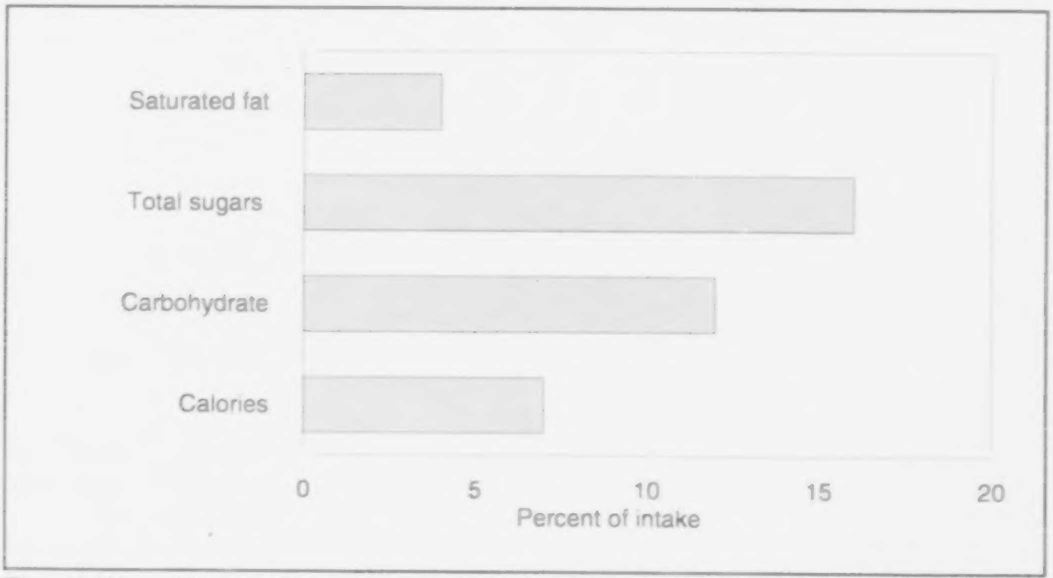

Figure 23 Percent energy and nutrients from Foods of Little Nutritional Value, First Nation women, Fort Severn, 2002

Discussion

This study was undertaken to provide baseline data for the Food Mail Pilot Project. The findings will enable INAC to evaluate the impact of reducing the cost of Priority Perishable foods and introducing measures to improve their recognition, quality and variety, in addition to a nutrition education program, on the food security of Fort Severn households and the nutrient intake of women of child-bearing age. The report highlights a number of nutrition concerns for Fort Severn residents, and in particular, for women of child-bearing age.

Just prior to the survey, the weekly cost of the Northern Food Basket for a family of four in Fort Severn was $275, 82% higher than in Ottawa. For three quarters of families in Fort Severn, income would be insufficient or barely sufficient to cover the cost of a healthy diet and other necessary family expenditures.

Food security is defined by the American Institute of Nutrition as "access by all people at all times to enough food for an active, healthy life" [104]. They claim that food security "includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies)." Food insecurity is defined as "a limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" [104]. In 1996, Canada and other countries at the World Food Summit agreed that "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" [105]. Food insecurity is the deprivation of a basic need and, in the sense it is used here, it results from a lack of financial resources. Food insecurity is undesirable in and of itself, but it is also a possible precursor to nutritional, health and developmental problems. Food insecurity may compromise psychosocial functioning among school-age children as well as their nutrition and health.

Twenty-seven percent of households with children had experienced hunger in the past 12 months among either adults or children or both. In 18% of households, both adults and children experienced hunger because they were unable to afford enough food. Fort Severn families on social assistance and the working poor were both significantly more food insecure than relatively well-off families. Paradoxically, despite this level of food insecurity, there was a high prevalence of obesity among women of child-bearing age. Similar findings have been documented among mildly food-insecure individuals in a number of other studies [106] [107].

Although BMIs were only available for 58% of women, it is unlikely that we have overestimated the prevalence of obesity. According to the BMI, almost half of women in Fort Severn are at high risk of obesity-related diseases. Twenty-one percent of women with a BMI under 35 also had a waist circumference that places them at considerable risk of obesity-related diseases. Both measures suggest that a high percentage of women are at risk for CVD and type 2 diabetes. In this study 12% of women reported medical conditions affecting their diet. They included diabetes (5%), gallbladder disease (5%) and high blood pressure (1.5%).

Self-rated health status is considered a reliable indicator of health across ethnic groups, and a reliable predictor of morbidity and mortality [108] [109]. Generally, poor self-rated health is associated with obesity, although we were unable to find a relationship in Fort Severn [110]. The percentage of women who rated their health as fair or poor was about six times as high as among women in the general Canadian population. The high smoking rate would have negative long-term effects on health and increase the risk of CVD and cancer of the lung and kidney.

We know there is a high prevalence of type 2 diabetes among First Nation women in Canada and that the risk of developing this disease is associated with obesity, a sedentary lifestyle and the transition to a store-based diet. Given the health conditions of women in Fort Severn, immediate action is warranted to reduce the risk of diabetes. There is also growing evidence that a low intake of certain essential nutrients may play a role in the development of type 2 diabetes and CVD. These nutrients include folate, iron and fibre, nutrients whose intake was inadequate [111]. A traditional diet and active lifestyle confer a degree of protection against these chronic diseases, but as lifestyles and diets become more westernized, there is a growing risk. Furthermore, there is mounting evidence that socio-economic status is a less important risk factor for chronic disease than stability in the physical and social environment, an individual's sense of understanding of his/her environment and control over events affecting his or her life [112] [113]. In this respect, we found a number of factors that could affect this sense of stability and control, including unemployment, extreme concern about alcohol and drug abuse, family violence and high food costs.

In Fort Severn, extreme concern about being able to afford enough food was associated with poor or fair self-rated health in 2002. Since 1992, the self-rated health of women of child-bearing age in this community has deteriorated, their concern about food costs has increased and the smoking rate has increased from 48% to 56%. For families on social assistance, a healthy diet became less affordable over this period.

We did not find a statistically significant relationship between food security status or socio-economic group and mean intakes of calcium, folate and vitamin A. It is possible that such relationships exist, but in view of the inherent day-to-day variation in nutrient intake, the relatively small sample size in this study may have made it impossible to detect any significant differences. Other reasons why such relationships were not found may include the generally low socio-economic status among all socio-economic groups, the general lack of nutritious choices available to the community, the practice of sharing, and the lack of high-quality, reasonably priced Priority Perishable foods.

About 10% of women were taking vitamin and mineral supplements, so that these women would probably meet their requirements for these nutrients. However, a high percentage of women had inadequate intakes of folate, vitamin B_6, vitamin C, magnesium and copper and almost a quarter an inadequate intake of iron.

We used the current EARs to estimate the percentage of the population with inadequate intakes of vitamins and minerals. In doing so, it is important to bear in mind that the EARs are based on the requirements of the general North American population. While they recognize differences in the distribution of requirements of a diverse population, no information is available on the specific nutrient requirements of First Nation people living in a sub-Arctic climate. Further research is needed to estimate the average nutrient requirements of First Nation people, given their present diet and lifestyle. To complicate matters, the effects of an inadequate intake of certain nutrients on health are often subtle and chronic diseases resulting from inadequate intakes take years to develop.

The mean calorie intake reported in this survey seems unreasonable, given the prevalence of obesity. This contradictory finding may be due to the fact that 28 of the participants were enrolled in a community weight loss program. Under-reporting may also be a factor, given the low consumption of Foods of Little Nutritional Value (106 Calories, compared to 257 in 1992). However, participants in community meetings believed that women in this age group had cut down on their consumption of junk foods and, because they were very interested in the survey, they would not knowingly under-report their food consumption. It was also suggested at the community meeting that the survey took place just prior to Christmas and that during this period, food consumption is generally lower than usual. Despite the low caloric intake, however, the percentage of energy from saturated fat was much higher than recommended.

Alcohol can be an important source of calories but no alcohol was reported on the 24-hour recall. This is understandable since Fort Severn is a dry community and alcohol consumption, therefore, is not likely to be reported. However, given the level of concern expressed about alcohol and drug abuse, the zero consumption of alcohol reported on the 24-hour recall may be inaccurate.

There is growing evidence that the practice of certain food consumption patterns such as a high consumption of calories from fat and saturated fat, a low fibre intake, and a high consumption of sugar-sweetened drinks, particularly among those who are genetically susceptible, can result in CVD and type 2 diabetes [51].

Only 31% of the recalls included traditional food and no one reported organ meats during this period. According to the Food Frequency Questionnaire, this was true for the previous month as well. In fact, the amount of traditional food reported in this survey is much lower than we have found in any previous survey of women in isolated communities. It would also appear to be lower than in 1992, but comparison between the two surveys is difficult since the earlier survey took place in the spring, when goose and other traditional foods were much more plentiful. A more accurate picture of usual consumption would require the collection of data in two or more seasons.

If some of this decline is real and there is a growing shift toward a market-based diet, there is a potential for negative health effects. Some women had inadequate intakes of a number of essential nutrients including iron, vitamin B_6 and vitamin B_{12}, all of which were significantly higher on the days when country food was consumed. If traditional foods are less available during certain times of the year, it is all the more reason to select store-bought foods more carefully in order to ensure replacement of nutrients that would have otherwise been supplied by traditional food.

It is important to note, however, that there were some positive dietary changes since 1992, including a greater use of whole grain bread, a lower consumption of fruit drink crystals without vitamin C, the substitution of aspartame-sweetened drinks for regular soft drinks and an apparent decline in the consumption of Foods of Little Nutritional Value and sugar.

A high consumption of store meat was primarily responsible for the excessive saturated fat level in the diet. Unlike traditional food, store meat and high-fat dairy products contain a type of saturated fat which has the greatest effect on total and LDL cholesterol and on the risk factors associated with type 2 diabetes and CVD. This food consumption pattern, combined with a lower consumption of traditional food, also meant that Fort Severn women obtained a higher percentage of energy from fat and saturated fat than either of the other two pilot project communities [114 115]. It is very likely that when caloric intake is more normal or when there is less under-reporting, the amount of fat and saturated fat would be higher and these nutrients would contribute as much or more energy to the diet. With a more normal caloric intake, however, vitamin and mineral intakes would probably also be more adequate.

In order to reduce saturated fat intake, it is important for women to eat more traditional foods, select leaner store meats, substitute skim, 1% or 2% milk for whole fluid or evaporated milk and avoid frying food. From the point of view of preventing heart disease, it would also be helpful if consumers replaced hydrogenated soft margarine and butter with non-hydrogenated margarines or oil (olive, canola, soybean or sunflower). Unfortunately, the purchase and consumption of fruits and vegetables, rich sources of vitamin A, vitamin C, folate and fibre, was very low. Consumers cited cost, poor quality, a lack of variety and limited availability as the most important barriers to buying more fresh fruit and vegetables. Furthermore, fruits and vegetables appear to be of poor quality in Fort Severn, so there is little incentive to eat more of these foods. As in the other pilot project communities, few consumers said they were not buying more fresh fruit and vegetables because they preferred canned or frozen products, disliked these foods, felt that these foods were not needed to be healthy, or because they did not know how to prepare them.

Much of the health risk associated with obesity is related to poor physical fitness. By increasing physical exercise, individuals can improve fitness irrespective of changes in weight. To prevent unhealthy weight gain with aging, 60 minutes of moderate exercise per day is needed.

This survey illustrates how important it is for women to receive diet counselling when they attempt to lose weight to ensure that they continue to meet their need for essential vitamins and minerals on a low-calorie diet. It is evident that food choices must change in order to meet requirements for micronutrients among women of child-bearing age. Vitamin, mineral and fibre intakes could be vastly improved by a few simple changes or substitutions, including the consumption of more traditional foods, leaner store meats and more fish, lower-fat dairy products, more fruit and vegetables, substitution of fruit for juice or sweetened drinks, more whole grain bread and cereals, replacement of fruit drink crystals with frozen fruit juice, whole grain pastas and rice instead of regular pasta or instant rice, and non-hydrogenated margarine or oil instead of soft hydrogenated margarine or butter.

For centuries, traditional food has been central to the health of the Cree of Fort Severn. It has provided most of the essential nutrients. Hunting and fishing and the preparation of traditional food reinforced Aboriginal values, provided physical exercise and contributed to a feeling of pride and well-being. To reinforce this practice, the nutrition education program will promote consumption of a variety of traditional foods and emphasize ways of using Priority Perishable store foods in combination with traditional foods in order to facilitate their wider adoption as soon as possible.

The nutrition and household surveys have demonstrated that the pilot project is appropriately focussed to address some of the major concerns of this community. If successful, it should help to improve food security by lowering the cost of Priority Perishable foods, thereby improving the intake of essential nutrients such as vitamin A, folate, vitamin C, vitamin B_6, calcium, magnesium and fibre. Food security could be further improved by improving access to traditional food through the purchase of community freezers or increased financial assistance to hunters, but such measures are beyond the scope of the pilot project.

If the pilot project also succeeds in reducing the consumption of expensive convenience foods and Foods of Little Nutritional Value, it may indirectly lower food expenditures or improve nutrient intake derived from the same level of expenditure. The nutrition education program being undertaken as part of the pilot project will address some of these issues and encourage more nutritious choices as well as healthier cooking methods.

It would also be helpful if the pilot project provided some training to retail staff and shippers in order to improve marketing and availability of high-quality Priority Perishable foods. Special shelf stickers and posters in English and Cree will clearly identify the Priority Perishable foods so that consumers will be better able to make healthier food choices.

Finally, it is important to place these findings in perspective. Poor health behaviours often represent coping strategies by populations under stress, and chronic disease results from the interplay of many factors, including nutrition. The availability of high-quality, reasonably priced nutritious food choices is essential to positive change. Other factors may also indirectly affect food security, including the purchase of high-cost convenience foods and Foods of Little Nutritional Value, as well as cigarettes and alcohol, all of which reduce the amount of money available for nutritious food. Creating a more secure environment by improving employment opportunities, recreational programs and less dependence on smoking and alcohol will also contribute to a more stable environment and a greater interest in healthier food choices. Improvements to nutrition and health can be expected to result in benefits not only for women of child-bearing age, but also for their children and future generations.

While the pilot project will help to reduce prices and improve nutrition knowledge and skills, it cannot be expected to completely solve the food security problem or to address all of the underlying problems being experienced by the people of Fort Severn. As in the other pilot project communities, major improvements to the situation will require action on many fronts, including the income side, as well as the joint effort of community leaders, health professionals and educators.

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APPENDIX A – NUTRITION QUESTIONNAIRE

ID		▨		▨				▨			

INT NO		

Nutrition Questionnaire

Fort Severn Food Mail Pilot Project

2002

Note to interviewer: Please enter date and starting time and circle AM or PM:
Day: ________ Month: __________ Starting time: ________AM / PM

Note to interviewer: Please enter time when the interview is complete and circle AM or PM: ________AM / PM

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A. 24-Hour Recall

This part of the questionnaire asks about all the foods and drinks you consumed over the past 24 hours. We want to include everything, both country and store foods – and not only meals, but also snacks and beverages. First we will make a list, according to the TIME of day you ate each meal or snack. Then later we will review the list to make sure that nothing is forgotten and to add the amounts of each item. This is easier than you may think at first. From this list we will be able to know if people are getting the energy and nutrients they need for good health.

Let's begin at this time yesterday. Where were you at this time yesterday? *(This helps the person to recall.)* Did you eat or drink anything at this time yesterday? When was the first time after this that you ate or drank something? What did you have? When was the next time you had something to eat or to drink? What did you have? *[LEAVE SPACES BETWEEN FOODS AND TIMES, ESPECIALLY AFTER COFFEE AND TEA SO THAT MILK OR SUGAR CAN BE ADDED ON THE SECOND PASS.]*

(When you have covered 24 hours, then say) Let's go back over this list and add the amounts and ask for details about each food. I have some measuring cups, spoons, bowls and food models to help estimate the amounts. *(Set out the household measures and the food models.)*

First, you mentioned *(name of food or drink)*. *[ON THE SECOND PASS, ASK FOR MORE DETAIL ABOUT THE DESCRIPTION OF THE FOOD, E.G., What type? Did you add anything to it (e.g. to the coffee, to the bannock, to the cereal, etc.), What brand?]* Using these measuring cups or food models, how much did you have at *(time)* yesterday? *(Continue until the full 24 hours are covered. Review the list to ensure that a full 24 hours are covered, and for a complete description of each food and amount.)* *[DON'T FORGET TO ASK IF THE FOOD WAS CANNED, MADE FROM A MIX OR FROZEN AND TO NOTE "C", "M" OR "F" IN THE SECOND COLUMN.]*

(If homemade food mixtures are reported, ask about the recipe and record on the recipe form at the end.) USING A SMALL POST-IT, LABEL EACH RECIPE WITH A NUMBER AND AFTER YOU FEEL YOU HAVE A COMPLETE DESCRIPTION OF EVERYTHING CONSUMED DURING THAT 24 HOURS, ASK THE PARTICIPANT TO PROVIDE THE INGREDIENTS AND AMOUNTS (USING THE MODELS OR HOUSEHOLD MEASURES ***AND*** *THE NUMBER OF PORTIONS (USING A HOUSEHOLD MEASURE) THE RECIPE MAKES. FOR TOTAL NUMBER OF SERVINGS, USE NUMBER OF PORTIONS AND MODELS (E.G. MAKES 6 MO-XL).*

We also need to know if you take any nutrition supplements and what kind. *[COMPLETE LARGE 24-HOUR RECALL FORM.]*

ID		▨		▨				▨			

B. Food Frequency Questionnaire

Now I would like to ask you about the past month. These questions will only ask about how often you ate or drank certain foods or beverages. This information is important because it provides a better picture of what you usually eat over a longer period.

I will give you a series of cards with a list of foods. Together we will read each list and I will ask you to estimate how often you have consumed these foods or beverages *over the past month.*

101 Let's begin with list A. Starting with caribou, did you eat caribou during the past month? *[CHECK YES OR NO. IF NO, GO TO NEXT FOOD.]*

102 If YES, how often did you eat caribou over the past month? *[FOR EACH FOOD, ENTER HOW OFTEN THE FOOD IS EATEN (TIMES PER DAY OR WEEK OR MONTH) IN ONE OF THREE COLUMNS.]*

101	**Have you eaten any of the foods on this list in the past month?**	**YES √**	**NO √**	**102 IF YES, how often? (Number of times per ...)**		
				Day	**Week**	**Month**
1	Caribou					
2	Caribou fat					
3	Moose					
4	Liver from caribou or moose					
5	Canada goose					
6	Snow goose					
7	Duck					
8	Partridge (grouse)					
9	Ptarmigan					
10	Rabbit					
11	Beaver					
12	Arctic char					
13	Trout					

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		▨		▨				▨			

101	Have you eaten any of these foods in the past month?	YES √	NO √	102 IF YES, how often? (Number of times per ...)		
				Day	Week	Month
14	Whitefish					
15	Pike					
16	Walleye (pickerel)					
17	Mariah fish					
18	Other local fish (Specify:______________)					
19	Blueberries					
20	Cloudberries (headberries)					
21	Blackberries					
22						
Now let's look at List B. *[SHOW LIST B.]*						
23	Baked bannock					▨
24	Fried bannock					▨
25	White bread					▨
26	Whole wheat bread					▨
27	Eggs					▨
28	Packaged sandwiches or hamburgers					
29	Canned stew					
30	Processed cheese (e.g., Velveeta, Kraft slices)					
31	Block or grated cheese					
32	Cheez Whiz					
33	Yogurt					
34	Frozen fried breaded chicken					
35	Frozen pizza					
36	Pizza made from mix					
37	Frozen Chinese food					
38	Other frozen meals					
39	Kraft Dinner or other macaroni and cheese dinner					

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101	**Can you tell me if you have eaten any of these foods on this list in the past month? And if so, how often?** *[SHOW LIST C.]*	YES ✓	NO ✓	102 IF YES, how often? (Number of times per ...)		
				Day	Week	Month
40	Fresh potatoes					
41	Frozen French fries					
42	Instant mashed potatoes					
43	Fresh carrots					
44	Frozen carrots					
45	Canned corn					
46	Other canned vegetables					
47	Canned fruit					
48	Oranges					
49	Apples					
Now I would like to show you a list of vegetables. From this list can you tell me which 5 vegetables (fresh or frozen) you have eaten most often in the past month? *[DO NOT READ THE LIST. SHOW CARD D, CHECK YES FOR THE 5 VEGETABLES THE RESPONDENT SELECTS AND ENTER HOW OFTEN EACH VEGETABLE WAS EATEN IN PAST MONTH.]*						
50	Green or yellow beans					
51	Broccoli					
52	Cabbage					
53	Cauliflower					
54	Corn					
55	Lettuce					
56	Mixed vegetables, frozen					
57	Mushrooms					
58	Onions					
59	Parsnips					
60	Peas, frozen					
61	Peppers					
62	Salad mix, fresh					
63	Spinach					

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		▨		▨				▨			

[CHECK YES FOR THE 5 VEGETABLES THE RESPONDENT SELECTS AND ENTER HOW OFTEN EACH VEGETABLE WAS EATEN IN THE PAST MONTH.]	YES ✓	NO ✓	**102 IF YES, how often? (Number of times per ...)**		
			Day	**Week**	**Month**
64 Squash					
65 Sweet potatoes					
66 Tomatoes					
67 Turnips					
68 Other fresh or frozen vegetables (specify)					
Now I would like to show you a list of fruit. From this list can you tell me which 5 fruit (fresh or frozen) you have eaten most often in the past month? *[DO NOT READ THE LIST. SHOW CARD E. CHECK YES FOR THE 5 FRUITS THE RESPONDENT SELECTS AND ENTER HOW OFTEN EACH FRUIT WAS EATEN IN THE PAST MONTH.]*					
69 Bananas					
70 Blueberries					
71 Cantaloupe					
72 Cherries					
73 Grapefruit					
74 Grapes					
75 Kiwi					
76 Peaches					
77 Pears					
78 Pineapple					
79 Plums					
80 Strawberries					
81 Watermelon					
82 Other fresh or frozen fruit					

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Finally, I would like to ask you about drinks and snack foods. ***[SHOW LIST F.]***		**YES √**	**NO √**	**102 IF YES, how often? (Number of times per ...)**		
101	**Have you eaten any of these foods in the past month?**			**Day**	**Week**	**Month**
83	Tang or other fruit drink crystals with vitamin C					
84	Kool-Aid or other fruit drink crystals - no vitamin C					
85	Sunny Delight					
86	Fresh fruit juice (e.g., Tropicana)					
87	Frozen fruit drinks (punch, lemonade)					
88	Frozen pure fruit juice (e.g., McCain orange juice, apple juice)					
89	Fresh or boxed milk					
90	Chocolate milk					
91	Chocolate bars					
92	Potato chips					
93	Coffee *[IF YES, ASK HOW MANY CUPS PER WEEK]*				cups	
94	Tea *[IF YES, ASK HOW MANY CUPS PER WEEK]*				cups	
95	POP *[IF YES, ASK HOW MANY CANS OR LARGE GLASSES PER WEEK]*				cans	

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The next few questions are about preparing food in the past month.

103	First, did you usually put anything on bread or bannock? *[CIRCLE YES OR NO]*	YES	NO
IF YES, can you tell me which of these you usually use? *[CHECK ONE]*		√	
a	Hard margarine		▨
b	Soft margarine		▨
c	Butter		▨
d	Lard		▨

104	In the past month what kind of milk did you usually use on your cereal ? *[CHECK ONE]* √	
a	Fresh or boxed milk	
b	Canned milk	
c	Powdered milk	
d	Don't use milk	
e	Didn't eat cereal	

105	When you prepared mashed potatoes, what kind of milk did you usually add?	*[CHECK ONE]* √
a	Fresh or boxed milk	
b	Canned milk	
c	Powdered milk	
d	Didn't use milk	
e	Didn't eat mashed potatoes	

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106	What do you usually put in your tea and coffee?	*[CHECK ONE FROM a TO j. CHECK k IF SUGAR IS USED.]* ✓	
		In tea ✓	In coffee ✓
a.	Powdered coffee whitener (e.g., Coffeemate, Coffee Delight)		
b	2 % milk (fresh or boxed)		
c	Whole milk		
d	1% milk		
e	Skim milk		
f	Canned milk		
g	Powdered milk		
h	Liquid coffee whitener (e.g., Coffee Rich)		
i	Real cream		
j	Don't use milk, cream or coffee whitener		
k	Sugar		
l	Don't drink tea or coffee		

107	In recipes, what kind of milk do you usually use?		*[CHECK ONE]*		
a.	**In bannock**	✓	**b.**	**In macaroni and cheese dinner**	✓
i	Fresh whole milk		i	Fresh whole milk	
ii	Fresh or boxed 2% milk		ii	Fresh or boxed 2% milk	
iii	Fresh skim or 1% milk		iii	Fresh skim or 1% milk	
iv	Powdered milk		iv	Powdered milk	
v	Evaporated milk, mixed with water		v	Evaporated milk, mixed with water	
vi	Evaporated milk, no water		vi	Evaporated milk, no water	
vii	Don't use milk		vii	Don't use milk	
viii	Don't make bannock		viii	Don't make macaroni and cheese dinner	

ID		▨		▨				▨			

108 What do you usually use to make baked bannock? *[CIRCLE ONE RESPONSE]*

a Lard
b Margarine
c Butter
d Oil (Specify canola, corn, vegetable, etc. ________________)
e Don't make baked bannock

109 If you make baked bannock, what proportion of flour to (name of fat given above) do you use?

_______cups flour _______pounds/tablespoons fat

110 What do you usually put in fried bannock? *[CIRCLE ONE RESPONSE]*

a Lard
b Margarine
c Butter
d Oil (Specify canola, corn, vegetable, etc.: ________________)
e Don't make fried bannock → **Go to Q113**
f Don't put any fat in it → **Go to Q112**

111 What proportion of flour to (name of fat given above) do you use to make fried bannock?

___________cups of flour ___________pounds/tablespoons fat

112 What do you fry it in? *[CIRCLE ONE RESPONSE]*

a Lard
b Margarine
c Butter
d Oil (Specify canola, corn, vegetable, etc.________________)

ID		▨		▨				▨			

113 What do you usually use to fry meat or fish? *[CIRCLE ONE RESPONSE]*

a Lard
b Margarine
c Butter
d Oil (Specify canola, corn, vegetable, etc.: ________________)
e Don't fry meat or fish

ID		▨		▨				▨			

C. Health and Lifestyle

This section asks a few questions about your health and lifestyle.

200 Compared to other people your age, would you say your health is excellent, very good, good, fair or poor? *[CIRCLE RESPONSE]*

a excellent
b very good
c good
d fair
e poor

201 Do you have any medical condition that affects what you eat? *[CIRCLE RESPONSE]*

1 YES 2 NO

If YES, please explain____

202 Are you pregnant at the present time?

a YES

b NO →

c Don't know →

d Refuse to answer →

Go to Q204

203 How long have you been pregnant? _______ months __________ weeks

204 Are you presently breast-feeding? 1 YES 2 NO

ID		▨		▨				▨			

Next, I would like to ask you some questions about smoking.

205 Have you ever been a regular smoker of cigarettes? *[CIRCLE RESPONSE]*

1 YES

2 NO → **Go to Q210**

206 How old were you when you started smoking? *[ENTER AGE]* ____ years old

207 At the present time, how often do you smoke cigarettes? *[CIRCLE RESPONSE]*

a every day

b occasionally

c not at all → **Go to Q209**

208 On the average, how many cigarettes do you smoke a day? *[ENTER NUMBER]*

_______ cigarettes → **Go to Q210**

209 How long ago did you stop smoking cigarettes?

a Less than 1 year ago *[ENTER NUMBER]:* _______ months

b More than 1 year ago *[ENTER NUMBER]:* _______ years

ID		▨		▨				▨			

The next question is about your current physical exercise.

210 Which of the following statements best describes your activities for most days when you are in the community? *[SHOW CARD AND READ LIST. CIRCLE ONE RESPONSE.]*

a I am usually sitting and do not walk around very much.

b I stand or walk around quite a lot, but I do not have to carry or lift things very often.

c I usually lift or carry light loads or I have to climb stairs or hills often.

d I do heavy work or carry heavy loads.

211 In the past year, how much time would you say that you spent on the land (fishing, trapping, hunting)? *[DO NOT READ LIST. CIRCLE ONE RESPONSE.]*

a none
b less than 1 month
c 1 month
d 2 to 3 months
e 4 to 5 months
f 6 months
g more than 6 months

D. Demographic Information

To complete the study we need some personal information. Like the entire study, this information is totally confidential.

300 First, what ethnic group do you belong to? *[CIRCLE RESPONSE]*

a Cree
b Other Aboriginal (Specify: ______________________)
c Non-Aboriginal

ID

301 What is your date of birth? ____________________ MONTH DAY YR 302 Age ____YRS

In order to determine if women in this community are getting the food they need for good health, we need to collect information on height, weight and waist measurements. The nursing staff at the Health Centre have agreed to make arrangements for us to record this information at the Health Centre to make sure that the information is accurate.

303 Would you be willing to go to the Health Centre on ________(date or day) to get your height, weight and waist/hip measurements done? *[CIRCLE RESPONSE]*

1 YES 2 NO

304 IF NO, can you tell me your height, weight and waist measurement?

HEIGHT ___________cm OR ___________inches

WEIGHT ___________kg OR ___________pounds

WAIST ___________cm OR ___________inches

305 Do you usually buy the food for your household?

1 YES → **Go to Household Questionnaire**

2 NO **THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION. CAN I SPEAK TO THE PERSON WHO USUALLY BUYS THE FOOD?**

APPENDIX B – HOUSEHOLD QUESTIONNAIRE

House Number		▨		▨			

Interviewer Number		

Household Questionnaire

Fort Severn Food Mail Pilot Project

2002

Note to interviewer: Please enter date and starting time and circle AM or PM:
Day: _____ Month: ______ Starting time: ________AM / PM

Note to interviewer: Please enter time when the interview is complete and circle AM or PM): ______AM / PM

House Number		▨		▨			

[PLEASE NOTE THAT ONLY THE PERSON WHO USUALLY BUYS MOST OF THE FOOD SHOULD COMPLETE THIS QUESTIONNAIRE]

A. HOUSEHOLD COMPOSITION, ACCESS TO COUNTRY FOOD AND COMMUNITY CONCERNS

Let's begin with a few questions about your household.

400 Can you tell me how many Aboriginal and non-Aboriginal adults are living in this household?

Age Group		1 Can you tell me how many are Aboriginal?	2 Can you tell me how many are non-Aboriginal?
a	Between the ages of 18 and 44?		
b	Between the ages of 45 and 59?		
c	Between 60 and 64?		
d	And age 65 and over?		

401 Can you tell me how many persons **AGED 17 OR UNDER** live in this house and their ages? *[INDICATE THE NUMBER OF PEOPLE IN EACH AGE GROUP IN THE SECOND ROW OF THE APPROPRIATE COLUMN.]*

Age	<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
No.																		

402 Is your household able to get country food most of the time? *[CIRCLE RESPONSE]*

YES

NO

Don't know

House Number		▨		▨			

403 **IF YOU CANNOT GET COUNTRY FOOD**, can you tell me why? *[DO NOT READ REASONS. WRITE THE NUMBER OF THE FIRST 3 REASONS IN THE SPACES BELOW. IF NECESSARY, PROMPT BY ASKING "WERE THERE ANY OTHER REASONS?"]*

1. No transportation
2. No hunter or fisherman in the household
3. Hunter or fisherman in family is sick/ injured
4. Hunter or fisherman is working, so doesn't have time to hunt
5. Gas too expensive
6. Repairs too expensive
7. Country food not available
8. Food is not shared in the community
9. Have nowhere to store country food
10. No hunting or fishing equipment
11. Other, explain ______________________________ ______________________________

Reason 1. ______________ Reason 2. ______________ Reason 3. ______________

404 First, I would like to read a list of events or problems that may affect you and your community. For each one, please tell me if you are not concerned, a little concerned, or extremely concerned about this problem at the present time. *[READ EACH PROBLEM AND CIRCLE 1, 2 OR 3 FOR EACH PROBLEM.]*

		Not concerned	A little concerned	Extremely concerned
a	Alcohol or drug abuse	1	2	3
b	Not having enough money for food	1	2	3
c	Not being able to get country food	1	2	3
d	The safety of country food	1	2	3
e	Family violence	1	2	3
f	Not enough jobs in the community	1	2	3

House Number							

B. FOOD PURCHASING

Now I would like to talk about where you usually buy your food.

500 Where do you usually buy most of your store meat? From the Washaho store, from the Northern store, from the south by Food Mail, or from the south by air cargo? *[CHECK ONE. ASK ABOUT EACH FOOD LISTED BELOW. IF RESPONDENT DOES NOT BUY THIS FOOD, CHECK NA.]*

		1 Washaho	2 Northern	3 South by Food Mail	4 South by air cargo	5 Other. (specify)	6 NA
a	Store meat	☐	☐	☐	☐	☐	☐
b	Fresh fruit	☐	☐	☐	☐	☐	☐
c	Fresh vegetables	☐	☐	☐	☐	☐	☐
d	Frozen food	☐	☐	☐	☐	☐	☐
e	Fresh milk	☐	☐	☐	☐	☐	☐

House Number							

Now I would like to talk about the quality of the food SOLD in this community.

501 How would you describe the quality of the following kinds of food sold in your community IN THE PAST 4 WEEKS? Would you say it was poor, fair, good or excellent? *[DO NOT READ "DON'T KNOW" OR "NOT AVAILABLE." CHECK IF THIS IS THE RESPONSE.]*

	1 Poor	2 Fair	3 Good	3 Excellent	Don't know	NA
a. Apples	☐	☐	☐	☐	☐	☐
b. Oranges	☐	☐	☐	☐	☐	☐
c. Bananas, grapes	☐	☐	☐	☐	☐	☐
d. Potatoes	☐	☐	☐	☐	☐	☐
e. Carrots, onions, turnips, cabbage	☐	☐	☐	☐	☐	☐
f. Lettuce, tomatoes, peppers	☐	☐	☐	☐	☐	☐
g. Broccoli, cauliflower	☐	☐	☐	☐	☐	☐
h. Bread	☐	☐	☐	☐	☐	☐
I. Eggs	☐	☐	☐	☐	☐	☐
j. Fresh milk	☐	☐	☐	☐	☐	☐
k. Frozen store meat	☐	☐	☐	☐	☐	☐
l. Frozen vegetables	☐	☐	☐	☐	☐	☐
m. Other frozen food	☐	☐	☐	☐	☐	☐

502 Is there enough variety of fresh fruit and vegetables available in Fort Severn? Always, most of the time, sometimes or never? *[DO NOT READ "DON'T KNOW" BUT CHECK IF THIS IS THE RESPONSE.]*

☐ Always ☐ Most of the time ☐ Sometimes ☐ Never ☐ Don't know

House Number		▨		▨			

503 Compared to this time last year, have you noticed that the price of fresh fruits and vegetables is higher, lower or the same? *[DO NOT READ "DON'T KNOW." CHECK RESPONSE.]*

☐ Higher ☐ Lower ☐ Same, no change ☐ Don't know

504 Here is a list of reasons people sometimes give for not buying fresh fruit and vegetables. What is keeping you from buying more of these foods? *[SHOW CARD. READ LIST. CHECK ALL THAT APPLY.]*

☐ They cost too much
☐ Poor quality
☐ Not enough variety
☐ Often not available
☐ Don't know how to use them
☐ They don't keep well at home
☐ Prefer canned products
☐ Don't like the taste
☐ Too much trouble to cook them
☐ Don't need these foods to be healthy
☐ Already eat a lot of these foods
☐ Can't digest these foods
☐ Can't afford them
☐ Prefer frozen products
☐ Another reason:______________________________

505 Here is a list of reasons people sometimes give for not buying fresh or boxed milk. What is keeping you from buying more milk? *[SHOW CARD. READ LIST. CHECK ALL THAT APPLY.]*

☐ It costs too much
☐ It's sometimes sour or bad
☐ Often not available
☐ Have difficulty digesting milk
☐ Prefer canned evaporated milk
☐ Prefer powdered milk
☐ Don't like the taste
☐ Don't need milk to be healthy
☐ Already buy a lot of milk
☐ Can't afford it
☐ It's often past the "best before" date
☐ Prefer cheese or yogurt
☐ Another reason:______________________________

House Number							

Now I would like to ask you about WHICH foods you have purchased IN THE PAST 4 WEEKS.

506 First, can you tell me which of the following foods have you bought IN THE PAST 4 WEEKS? *[SHOW PICTURES OR CARD, READ LIST AND CHECK ALL THAT APPLY.]*

Fresh fruit:	☐ Apples	☐ Oranges	☐ Bananas	☐ Grapes	☐ Berries
	☐ Kiwi	☐ Plums	☐ Cantaloupe/ Honeydew melon	☐ Grapefruit	☐ Watermelon
	☐ Other (specify) ______________				
Fresh vegetables:	☐ Lettuce	☐ Broccoli	☐ Tomatoes	☐ Cauliflower	☐ Turnips
	☐ Cabbage	☐ Onions	☐ Peppers	☐ Carrots	☐ Potatoes
	☐ Cucumber	☐ Celery	☐ Squash	☐ Spinach	☐ Mushrooms
Milk products:	☐ Fresh milk	☐ Boxed milk	☐ Cheese	☐ Yogurt	☐ Ice cream
	☐ Powdered milk			☐ Canned evaporated milk	
Frozen food:	☐ Store meat	☐ Frozen pizza		☐ Frozen meals	
	☐ French fries	☐ Frozen mixed vegetables			
	☐ Other frozen vegetables				
	☐ Frozen fruit drinks (e.g., lemonade, fruit punch)				
	☐ Frozen pure fruit juice (e.g., McCain's orange juice or apple juice)				

C. FOOD SECURITY

This section asks questions about being able to afford food for your household. Some of the questions are very personal and may be difficult for you to answer. However, this information will help community and health leaders to have a better understanding of problems facing families in this community and to design better programs to help. Like the rest of the questionnaire, this information is strictly confidential and no names will be released to the community or government. You are free to refuse to answer any question, but your answers may be able to help others in Fort Severn and other First Nation communities.

I would like to read a series of statements that describe the experience of some families. I will also give you a card, so that you can read the statement and decide if it describes your experience.

House Number		▨		▨			

The first statements are about the food eaten in your household in the last 12 months and ***whether you were able to afford the food you need.*** For each of these statements, please tell me whether this happened often, sometimes or never for your household in the last 12 months. *[GIVE FOOD SECURITY CARD TO RESPONDENT SO THAT THEY CAN READ EACH STATEMENT.]*

600 Some families might say, ***"We worried whether our food would run out before we got money to buy more."*** In the last 12 months, did that happen often, sometimes, or never for your household ?

a Often [ ]
b Sometimes [ ]
c Never [ ]
d Don't know or refused [ ]

601 *Some families might say,* ***"The food that we bought just didn't last, and we didn't have money to get more."*** In the last 12 months did that happen often, sometimes, or never for your household?

a Often [ ]
b Sometimes [ ]
c Never [ ]
d Don't know or refused [ ]

602 *Some families might say,* ***"We couldn't afford to eat healthy meals."*** In the last 12 months did this happen often, sometimes, or never for your household?

a Often [ ]
b Sometimes [ ]
c Never [ ]
d Don't know or refused [ ]

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q603 AND Q604; OTHERWISE SKIP TO 1ST - LEVEL SCREEN]

603 *Some families might say,* ***"We could only feed our children less expensive foods because we were running out of money to buy food."*** In the last 12 months did this happen often, sometimes, or never for your household ?

a Often [ ]
b Sometimes [ ]
c Never [ ]
d Don't know or refused [ ]

604 *Some families might say,* ***"We couldn't feed our children a healthy meal, because we couldn't afford that."*** In the last 12 months, did that happen often, sometimes, or never for your household?

a Often [ ]
b Sometimes [ ]
c Never [ ]
d Don't know or refused [ ]

[1ST LEVEL SCREEN (SCREENER FOR STAGE 2): IF THE RESPONDENT ANSWERS "OFTEN" OR "SOMETIMES" TO ANY ONE OF QUESTIONS 600 TO 604, THEN CONTINUE TO STAGE 2; OTHERWISE SKIP TO Q620.]

House Number							

STAGE 2: ***[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q605; IF NOT, SKIP TO Q606.]***

605 *Some families might say,* ***"The children were not eating enough because we just couldn't afford enough food."*** In the last 12 months, did this happen often, sometimes, or never for your household?

a	Often	[ ]
b	Sometimes	[ ]
c	Never	[ ]
d	Don't know or refused	[ ]

606 Since this time last year, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?."

a	YES	[ ]	
b	NO	[ ]	→ **Go to Q608**
c	Don't know	[ ]	→

607 ***[IF YES ABOVE, ASK]*** How often did this happen...almost every month, some months but not every month, or in only 1 or 2 months?

a	Almost every month	[ ]
b	Some months but not every month	[ ]
c	Only 1 or 2 months	[ ]
d	Don't know	[ ]

608 In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

a	YES	[ ]
b	NO	[ ]
c	Don't know	[ ]

609 In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?

a	YES	[ ]
b	NO	[ ]
c	Don't know	[ ]

610 In the last 12 months, did you lose weight because you didn't have enough money for food?

a	YES	[ ]
b	NO	[ ]
c	Don't know	[ ]

2ND LEVEL SCREEN (SCREENER FOR STAGE 3): IF RESPONDENT ANSWERED YES TO ANY OF ABOVE QUESTIONS, THEN CONTINUE TO STAGE 3; OTHERWISE GO TO Q620.]

House Number		▨		▨			

STAGE 3:

611 In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?

a YES [ ]
b NO [ ] →
c Don't know [ ] →

Skip Q612

612 ***[IF YES ABOVE, ASK]*** How often did this happen ...almost every month, some months but not every month, or only in 1 or 2 months?

a Almost every month [ ]
b Some months but not every month [ ]
c Only 1 or 2 months [ ]
d Don't know [ ]

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q613 TO Q617; OTHERWISE SKIP TO Q618.]

The next questions are about persons living in the household who are *under 18 years of age*.

613 In the last 12 months, did you ever cut the size of their meals because there wasn't enough money for food?

a YES [ ]
b NO [ ]
c Don't know [ ]

614 In the last 12 months, did any of the children ever skip meals because there wasn't enough money for food?

a YES [ ]
b NO [ ] →
c Don't know [ ] →

Go to Q616

615 ***[IF YES ABOVE, ASK]*** How often did this happen...almost every month, some months but not every month, or in only 1 or 2 months?

a Almost every month [ ]
b Some months but not every month [ ]
c In only 1 or 2 months [ ]
d Don't know [ ]

House Number		▨		▨			

616 In the last 12 months, were the children ever hungry but you just couldn't afford more food?

a YES [ ]
b NO [ ]
c Don't know [ ]

617 In the last 12 months, did your children ever not eat for a whole day because there wasn't enough money for food?

a YES [ ]
b NO [ ]
c Don't know [ ]

[ASK Q618 IF RESPONDENT ANSWERED YES, OFTEN OR SOMETIMES TO ANY OF QUESTIONS 605 TO 617. OTHERWISE GO TO Q620.]

618 I would like to ask you about why your household was unable to afford enough food. Can you tell me the main reason? *[DO NOT READ REASONS. WRITE NUMBER OF FIRST 3 REASONS IN THE SPACES BELOW. IF NECESSARY, PROMPT BY ASKING, "WERE THERE ANY OTHER REASONS?"]*

a. Not working

b. Waiting for EI (Employment insurance) or social assistance

c. Not enough income

d. Spent money on medicine

e. Gave money away

f. Gave food away to others in the community

g. Had to buy hunting, fishing or trapping equipment, supplies or gas

h. Had to pay bills (like hydro, children's clothing, school supplies)

I. Spent money gambling

j. Food costs too much

k. Don't know or refuse

l. Other, explain ______________________________

Reason 1. __________ Reason 2. __________ Reason 3. __________

House Number							

[ASK Q619 IF RESPONDENT ANSWERED YES, OFTEN OR SOMETIMES TO ANY OF QUESTIONS 605 to 617. OTHERWISE GO TO Q620.]

619 When your household was unable to afford enough food, what did you do? *(DO NOT READ CATEGORIES. WRITE NUMBER OF FIRST THREE REASONS IN SPACES BELOW.)*

a. Ask for more social assistance (welfare/income support)
b. Ask store manager for more credit
c. Borrow food or money for food from friends or family
d. Go hunting or fishing
e. Ask help from CHR, nurse or doctor
f. Do without
g. Make an item to sell
h. Other, explain____

Action 1. ________________ Action 2. ________________ Action 3. ________________

[IF CHILDREN 5 OR UNDER IN THE HOUSEHOLD, ASK Q620. OTHERWISE GO TO Q621.]

620 During the past month, did any of the children in this household receive breakfast, lunch or snacks at day care, a pre-school program or kindergarten? *[CIRCLE RESPONSE]*

a YES
b NO
c Don't know

[IF CHILDREN BETWEEN 6 AND 17 IN THE HOUSEHOLD, ASK Q621. OTHERWISE GO TO SECTION D.]

621 During the past month, did any of the children in this household receive breakfast, lunch or snacks at school? *[CIRCLE RESPONSE]*

a YES
b NO
c Don't know

House Number		▨		▨			

Finally, to complete the questionnaire, we need to ask a few questions about household income and expenses.

D. EMPLOYMENT, INCOME AND EXPENSES

700 Can you tell me how many members of your household presently:

a Earn money from selling furs? _________

b Earn money from selling crafts (e.g., carvings, sewing, jewelry, etc.) _________

c Have a job or business? _________

d Receive a pension? _________

701 In the past month, did anyone in your household receive money from Employment Insurance (EI or UI)? *[CIRCLE RESPONSE]*

1 YES 2 NO 3 Don't know

702 In the past month, did anyone in your household receive social assistance (welfare/income support)? *[CIRCLE RESPONSE]*

1 YES → **GO to Q704**

2 NO

3 Don't know

House Number								

703 Can you tell me APPROXIMATELY the **total amount of money received *in the past 4 weeks*** by **ALL** household members from all sources (e.g. take-home pay from a job, money from selling furs or crafts, pensions, net income from running a business and Employment Insurance)? *[SHOW CARD TO PARTICIPANT TO REMIND HIM/HER OF DIFFERENT SOURCES OF INCOME AND ASK IF HE/SHE CAN TELL YOU ABOUT HOW MUCH INCOME WAS RECEIVED FOR THE PAST 4 WEEKS. CIRCLE THE CATEGORY WHICH BEST DESCRIBES THIS AMOUNT. DO NOT INCLUDE CHILD TAX BENEFITS.]*

a. No income
b. $1500 or less
c. $1501 to $2000
d. $2001 to $3000
e. $3001 to $4000
f. $4001 to $5000
g. $5001 to $6000
h. Over $6000
I. Don't know
j. Refuse to answer

704 Was your income last month, the same as other months? *[CIRCLE RESPONSE]*

a YES
b NO, more than usual
c NO, less than usual
d Don't know

705 Can you tell me approximately how much your household usually spends ***in an average week*** on food (including food purchased from grocery stores and restaurants)? $________

706 Last month approximately how much did you pay for rent, mortgage, electricity and heating fuel?

$___________

707 Last month approximately how much did you pay for skidoo parts and oil, bullets, naphtha and other supplies used for hunting or fishing?

$___________

The survey is now complete.

Thank you for your cooperation.

Int. No.

24-Hour Diet Recall

DATE ____/____/____ STARTING TIME ______ AM/PM

M D Y

SEE INSTRUCTIONS ON P. 1 OF THE NUTRITION QUESTIONNAIRE. *[ENTER C, M, OR F IN THE "C/M/F" COLUMN IF THE FOOD ITEM WAS CANNED, FROM A MIX OR FROZEN. ENTER BRAND NAME IN DESCRIPTION COLUMN WHEN FOOD IS A PREPARED PRODUCT. REVIEW LIST TWICE TO GET FULL DESCRIPTION AND AMOUNTS AND TO PROMPT MEMORY. ENTER RECIPES AND NUTRITION SUPPLEMENTS AND TIME FINISHED ON BACK OF PAGE. REMEMBER TO LEAVE SPACES BETWEEN MEALS SO THAT EXTRAS CAN BE ADDED LATER.]*

TIME		AM/PM	C/M/F	DESCRIPTION OF FOOD ITEM	# OF PORTIONS	DESCRIPTION OF PORTIONS	
						Model or Measure	Thickness (cm)

C means canned; M means made from a mix; F means frozen.

List of Nutrition Supplements

Did you take any vitamin, mineral or other nutrition supplements yesterday? *[CIRCLE RESPONSE]* **YES/NO**

If so, may I please see the label? *[RECORD THE BRAND NAME AND THE DRUG IDENTIFICATION NUMBER (DIN).]* **What is the usual amount taken each time? How many of these did you take yesterday? How often do you usually take this (times per day/week/month)?**
[INCLUDE: VITAMIN/MINERAL SUPPLEMENTS (E.G., CALCIUM, IRON, MATERNA); TONICS; ROLAIDS; TUMS; HERBAL PREPARATIONS]

Nutrition Supplement DESCRIPTION	DIN # *[CHECK LABEL]*	Quantity prescribed or usual amount taken each time (e.g., 150 mg, 1 tsp) *[CHECK LABEL]*	Amount taken in last 24 hrs	How often do you usually take this? *[ENTER TIMES PER DAY, WEEK OR MONTH]*		
				Day	Week	Month

RECIPE #1

Name of recipe:__________________Total number of servings____

Description of ingredients and cooking method	Quantity

How was it cooked? Circle one of the following: (boil, bake, roast, stew, fry, microwave). For how long?______min ______hours

RECIPE #2

Name of recipe:__________________Total number of servings______

Description of ingredients and cooking method	Quantity

How was it cooked? Circle one of the following: (boil, bake, roast, stew, fry, microwave). For how long?______min ______hours

NOTE: TIME FINISHED:______AM / PM